MOBILITY AND LANDUSE PATTERNS OF THE CODY COMPLEX IN SASKATCHEWAN

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Abstract

The Cody Complex is a late Paleo-Indian complex found throughout the Great Plains of North America. In Saskatchewan, material of the complex is mostly found as surface finds and therefore out of its original context. *In situ* Cody Complex material has only been recovered from three excavated sites in Saskatchewan. While various archaeologists (professional and avocational) have collected and recorded Cody material from surface finds throughout the province, the results of their efforst have not been widely disseminated. These issues have led to a situation in which little is known about the Cody Complex in Saskatchewan.

This thesis attempts to begin correcting this problem, firstly by acting as a reference source by compiling as much information as possible on the Cody Complex material found throughout Saskatchewan. Included in these reference materials are pictures, measurements and find locations of the projectile points and Cody knives whenever such information is available. Secondly an attempt is made to determine possible Cody Complex mobility and landuse patterns within the province.

Mobility and landuse patterns were determined based on the lithic material types used to make the Cody Complex projectile points and Cody knives. In particular the find locations of various specimens was compared to where the material could be acquired. Cody Complex projectile points and the associated knives were focused on due to most Cody Complex material in the province being surface collected. Based on the lithic types used to create these tools, the Cody Complex people in Saskatchewan were practicing a highly mobile and non-local landuse pattern, with a particular focus of interactions with more southern areas such as the Knife River Flint quarry area of North Dakota.

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Chapter 1 Introduction

1.1 Introduction

The Cody Complex is a Paleo-Indian complex found throughout the Great Plains of North America, including within the southern and central portions of Saskatchewan. However, the distribution and quantity of Cody Complex material in Saskatchewan has been poorly documented. Three major projectile point types and an asymmetrical knife referred to as Cody Knives are associated with the Complex in Saskatchewan. These projectile point types are Alberta, Scottsbluff (types I and II), and Eden. Other lithic tools associated with the complex include spurred end-scrapers, drills, and gravers.

1.2 Objectives

The main objective of this study was to investigate the Cody Complex occupation of Saskatchewan as revealed by the distribution of projectile points and asymmetrical knives, and to document the lithic material from which they are made. To achieve this the following objectives had to be attained:

1. As much Cody Complex material as possible had to be recorded from throughout the province. Of importance was provenience information and identification of lithic materials used to fabricate these artefacts.
2. The identification of the source locations of these lithic materials within Saskatchewan and externally.

1.3 Hypotheses

It has been noted (e.g. Hall 2009) that a database dependent wholly (or mostly) on surface finds can limit the extent of possible uses of the data. However, useful information can still be

gleaned from these data sets. This study has attempted to assess the following hypotheses in regards to the Cody Complex in Saskatchewan.

It has been observed by archaeologists that Paleo-Indian groups often used high quality exotic lithic materials (Goodyear 1989). In Saskatchewan, it has been observed that the exotic lithic material Knife River Flint is often associated with the Cody Complex and that it is the material that is used to make the majority of the projectile points and Cody knives. The first hypothesis is that Knife River Flint makes up the bulk of Cody Complex diagnostic tools, but that it will show a trend towards being less dominant farther away from the southeast corner of the province. If this is true there should be a shift toward the use of different lithic materials, often high quality local materials, replacing Knife River flint. Second these lithic materials will show a nonregional land use pattern at the site and small area scale. This same pattern should also be seen at a more regional level.

1.4 Methodology

The information for this thesis was collected from two main sources. The first was from previously published material on Cody Complex sites, collections, and isolated finds in Saskatchewan. The second source was from the general archeological community including avocational archaeologists and professionals in Saskatchewan. A background literature review was also conducted on Cody Complex material. This review was conducted on material found both inside and outside of Saskatchewan.

When possible, material from earlier publications on the Cody Complex recovered from Saskatchewan was examined personally. Unpublished material, particularly from avocational sources was also personally examined. This usually involved traveling to the location of the material whether it was visiting an avocational archaeologist and their collections directly or viewing the collections in local museums. Some of the material was also housed in the collections of the University of Saskatchewan and the Royal Saskatchewan Museum.

No field excavations were conducted by the author for this study and the majority of the projectile points and knives are from surface collections. Bamforth (2002:62) has suggested that surface collected material is of limited value, especially when found in singular or small assemblages. However, work by Gryba (2001), Hall (2009) and Gillespie (2002) show that research based on surface collected material can have value and may add knowledge about

distribution, mobility, and lithic material use. Many of the large collections were collected from the same area over a long period of time by a single or a few individual(s). In most cases, the avocational archaeologists did a thorough job of recording where the material was found. The location was usually recorded down to the quarter section of the legal land designation. For isolated finds, the locations are sometimes less precise, but some are also recorded down to the quarter section. If a point (or Cody knife) had no provenience it was photographed and recorded, but it was not included in the analysis of the material.

Other problems were also encountered while tracking down material for this study. Some private collectors were reluctant to have anyone view their material. This may be due to a fear that the material would be removed from their possession. Sometimes these reluctant collection holders were convinced to share their collections and the author was allowed to view them. In other cases, the author was unable to view the collections. Also on some occasions, the way some artefacts were displayed did not allow the best access to the material. This typically involved mounting artefacts behind glass with no way of observing the reverse face or allowing direct access to the material. Also, some artefacts were glued down leaving residue of the glue and other material attached to the artefacts.

All material that was examined was photographed with a 7.1 megapixel camera and measured with digital callipers. Individual photos were taken of complete or mostly complete projectile points. Group photos of these points were also taken when they were from one site. Incomplete items, including pieces that were just stems or blade fragments, were photographed in similar groups when appropriate. An archive of these items can be found in Appendix B.

A suite of measurements were taken of complete points as well as some partially broken points (those just missing the tip). Points that had substantial breakage had some measurements taken if the stem and shoulder were intact. However, damaged points with broken shoulders and/or stems were not measured. This was done because it has been suggested that on lanceolate points, particularly stemmed ones, the most important area for metric analysis is the hafting area (Pitblado 2003:66). This is because the blade areas of projectile points are often subject to large amounts of reworking which causes the final form to be significantly different from the original production appearance. However, the hafting area undergoes minimal to no reworking which makes them better representations of the original manufacture and appearance of the projectile point.

The measurements taken for this study were similar to the measurements used in other studies of Paleo-Indian projectile points (e.g. Knudson 1982; Pitblado 2003:65-77). These measurements include the length of the point, width at the shoulder, thickness at the shoulder, length of the stem, width of the stem and maximum thickness of the stem. The measurements were taken to the closest tenth of a millimetre although Pitblado (2003:74) has suggested that only the closest millimetre is necessary. The metrics for the points examined for this study can be found in Appendix A. Along with the measurements the type of point, if possible to determine, was recorded. Material type was also documented. Material type was one of the most important pieces of information recorded because lithic material types are considered to be very useful in determining mobility and land use patterns in Paleo-Indian groups (Bamforth 2002; Knell and Hill 2012).

1.5 Thesis Organization

The thesis is organized into two major parts starting with background information and then proceeding into the analysis of the data. Chapter two focuses on the culture history of Saskatchewan and the paleo-environment of Saskatchewan during the Cody Complex period. This is then followed by an overview of the Cody Complex, including how it was originally defined and how it has developed into the current understanding of the Complex. After this, Chapter four examines the major Cody Complex sites and areas of concentration. For a full list of all the Cody Complex material recorded in Saskatchewan see Appendix A. Chapter Five is a discussion of the different lithic material types identified from the Cody Complex assemblages of Saskatchewan. Chapter Six is the analysis of the data on the site and regional levels including the results and what it may suggest about the Cody Complex in Saskatchewan. Following this is the final chapter which contains concluding remarks.

Chapter 2 Culture History and Environment of the Study Area

2.1 Culture History of the Northern Plains in Saskatchewan

2.1.1 Introduction

Although technically all of Saskatchewan was the study area for this thesis, Cody Complex material is found predominately in the southern (Great Plains) part of the province. Therefore, only the culture history of this area will be examined. The Northern Plains culture history can be broken down into four major periods; three prior to the arrival of Europeans and one after (Figure 2.1). The structure of this culture history is based on the scheme originally proposed by Dyck (1983) and modified in Walker (1992). The three Precontact periods are separated based on major changes in the material culture. These changes include both technology and lifeway changes of the people inhabiting the Northern Plains. The Historic period begins with the appearance of Europeans and their material goods.

2.1.2 Paleo-Indian Period

The earliest period recognised in Saskatchewan is called the Paleo-Indian period and is dated between 11,500 – 7,500 years ago (Meyer and Walker 1999). This term is preferred instead of Early Precontact as it is the most common expression used in reference to the earliest inhabitants of the Northern Plains. The term has also has a long history of use to refer to this time period, since at least the 1960's (Wormington and Forbis 1965). These earliest inhabitants left behind large distinctive projectile points that have been used to define the archaeological complexes on the Plains.

Some of the earliest points found across the Northern Plains are distinguished by the unique technique of fluting. Fluting is the removal of a single (in most cases) large flake from the base of the projectile point. These fluted types are referred to as Clovis and Folsom projectile points. Clovis points are generally dated from about 11,500 to 10,900 B.P. (Hall 2009:17). The dates for Clovis are based on buried components found outside of Saskatchewan as no *in situ* Clovis points have been found in Saskatchewan. It has been suggested (Dyck 1983:73; Walker 1999:25) that Clovis subsistence focused on the hunting of Pleistocene fauna including, but not limited to, extinct forms of bison, Pleistocene horse and mammoth. Evidence for the butchering of these animals comes from numerous sites (Hoppe 2004). Other artefacts found in Clovis assemblages include bone foreshafts (Lahren and Bonnichsen 1974), spurred endscrapers (Rogers 1986) and various other types of bifaces and unifaces (Dyck 1983:71). A bone foreshaft has been found in Saskatchewan made of mammoth bone and is suggested to have been Clovis in origin (Wilmeth 1968).

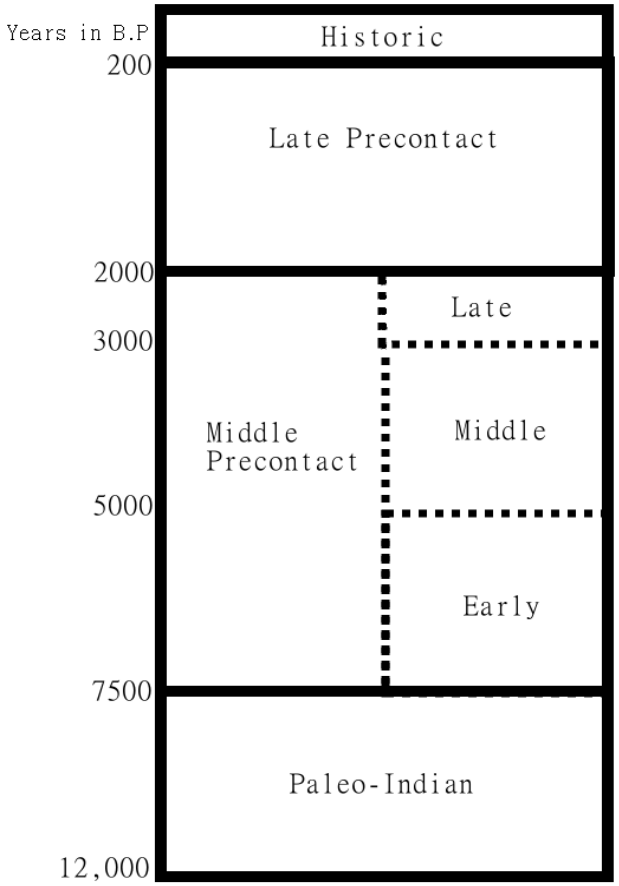

Figure 2.1: Approximate timeline on the Northern Plains

The second fluted point type found in Saskatchewan is the Folsom type, dating from about 10,900 to 10,200 B.P. (Hofman 1995). Like Clovis, no *in situ* sites with Folsom points have been excavated in Saskatchewan. Even with the inability to directly date Clovis and Folsom in Saskatchewan, it has been determined that the dates from Clovis and Folsom sites from more southern regions can be applied to these more northerly points found in Saskatchewan (Hall 2009:87). Due to the extinction or the significant decline of the Pleistocene fauna, Folsom subsistence appears to focus mostly on bison procurement (Dyck 1983:74; Walker 1999:25). Bone points are also associated with Folsom assemblages (Frison and Zeimens 1980) along with spurred endscrapers (Rogers 1968) and other bifaces and unifaces. A projectile point called the Midland type is closely associated with Folsom material. Midland points are often found in the Folsom levels of archaeological sites. The other associated artefacts found in purely Midland components are similar to assemblages from Folsom components. This has led to Agogino (1969) suggesting that Midland projectile points are well within the range of the Folsom projectile points. This means that Folsom and Midland belong to a single complex, consisting of fluted and unfluted points, an idea which has become more widely accepted (Pettipas 2011:39).

Along with these two fluted projectile point types there are also two unfluted point types found in Saskatchewan during the early portion of this time period. The first of these projectile points are referred to as Goshen points. Goshen projectile points are well crafted points which use a different form of basal thinning than the removal of flutes. This consists of several smaller thinning flakes being removed from the base. The dates for Goshen vary with an early date at the Hell Gap site of about 11,000 B.P. (Frison et. al. 1996:214). Later dates are also associated with Goshen such as the one at the Jim Pitts site of 10,185 B.P. (Sellet et. al. 2009:752). This difference in age is attributed to the Goshen-Plainview problem (Frison et. al. 1996). Goshen and Plainview points are virtually identical but surprisingly there is large temporal difference between Goshen sites on the Northern Plains and Plainview sites on the Southern Plains. Goshen/Plainview sites, from the Northern Plains, date older then on the Southern Plains. No sites with Goshen material have been excavated in Saskatchewan. However, the dates from Goshen sites on the Northern Plains of 11,000 years ago mean that this would not be an unreasonable time for the appearance of Goshen in Saskatchewan.

The second unfluted projectile type associated with this early time period is another projectile point with basal thinning flakes called the Basally-Thinned Triangular Complex

(Meyer et. al. 2011:12-16; Gillespie 2002). Some have suggested that these points were fluted and have given them other names such as Atypical (Kehoe 1966a) or Northwestern Fluted (Hall 2009:16). However, their appearance is much more Goshen-like with basal thinning and no real flutes are present. This suggests the name used by Meyer et. al. (2011) and Gryba (2001) is a better choice. Not much is known about the material culture of the complex, but one date of 10,500 BP is associated with a Basally-Thinned Triangular point from Charlie Lake Cave (Driver et. al. 1996). A recent study of Alberta fluted material has suggested that the reality of early point typology might be much more complicated with more than just two (or three) different types of fluted points being produced on the Northern Plains (Gillespie 2002:95-97).

The earlier Clovis/Folsom continuum was followed by the Agate Basin Complex which dates from 10,500 – 9,500 BP (Walker 1999). Agate Basin is contemporaneous with the basally thinned complexes, and overlaps with the end of the Folsom Complex. However, Agate Basin projectile points look distinctively different from these other projectile points. Complete Agate Basin points are long and much more slender then the contemporaneous projectile points previously discussed. Agate Basin points have no fluting or basal thinning flakes which usually results in a concave or straight base. It is suggested that the group of people who produced the Agate Basin points were unrelated to the previous inhabitants of the Northern Plains (Stanford 1999:312). The Great Basin area may be one possible spot where the Agate Basin Complex originated (Pettipas 2011:46).

Hell Gap projectile points appear shortly after the appearance of Agate Basin on the Great Plains. Most dates for Hell Gap range from about 10,400 – 9,600 BP (Holliday 2000:262 Table XIB). This would suggest that Hell Gap points developed out of the Agate Basin point style shortly after it appeared on the Great Plains. Hell Gap points are long and slender, much like Agate Basin points, but they narrow to the base from a shoulder-like position. This leads to a wide blade area when compared to the rest of the projectile point.

Developing from the Hell Gap point is the first true stemmed point and first member of the Cody Complex. This is the Alberta projectile point. Alberta points date from 10,200 to 9400 BP (Holliday 2000:269). Cody knives have been associated with Alberta points, leading to their inclusion in the Cody Complex. Cody knives are distinctive asymmetrical bifacial knives. The Cody Complex will be discussed in depth in chapter three. Alberta points and the Cody knives of the same age have a rougher appearance in their flaking when compared to the other members

of the Complex. This suggests that flintknapping techniques improved or that more care was put into the projectile point production later on in the Cody Complex.

Eventually these refinements in production technique led to the appearance of Scottsbluff and Eden point types. Holliday (2000:269) suggests that these points date from 9400 to 8800 years BP with this date extending to 8200 years BP on the Southern Plains if the Firstview projectile point type is included in the Cody Complex. Scottsbluff and Eden points are some of the earliest known Paleo-Indian points to be found *in situ* Saskatchewan at the Niska (Meyer 1985), Napao and Heron-Eden sites (Corbeil 1995; Linnamae and Johnson 1999).

The final portion of the Paleo-Indian period in Saskatchewan dates to roughly 8500 to 7500 years ago. This period is referred to by different monikers such as the Late Plano or Terminal Plano period. Associated with these time periods are numerous different point styles. Some of these points are lanceolate in shape such as Angostura, Lusk, Fredrick (Irwin-Williams et. al. 1973) and Jimmy Allen points (Pitblado 2003). Non-lanceolate point types from this period include Lovell-Constricted (Husted 1969) and Pryor-Stemmed (Frison 1976). Many of the lanceolate points show parallel-oblique flaking and have concave bases. These two traits are sometimes seen on Agate Basin points but to a much lesser degree. From where these points came or what they developed out of is not clear, but Frison (1991:394) has argued they developed in the foothills and mountain regions west of the plains. Due to the large range in variation in the projectile points, Peck (2011:104 and 117) suggests that these assemblages represents a transition period where spear and dart points are both being utilised. However, it is much more likely that the atlatl was present and in use from Clovis times onward (Dixon 2001:290; Hutchings 1997:130, 2011; Stanford 1996).

Near the end of the Paleo-Indian period the climate began to get warmer and drier which had a significant impact on the people inhabiting the Great Plains region including Saskatchewan. These changes in climate also coincide with a major change in projectile point styles.

2.1.3 Middle Precontact Period

The second major time division on the Northern Plains is the Middle Precontact (Archaic) period. This period dates from about 7500 - 2000 years BP. This period is divided in

to three sub-periods, from oldest to most recent: the Early Middle Precontact, Middle Middle Precontact and Late Middle Precontact. At the beginning of the Middle Precontact a major climatic change occurs in North America which appears to have significantly impacted the Great Plains.

This major climatic change was recognized as early as the mid 1950's by Anteves (1955) who called it the Altithermal. This warm period has also been referred to by other names such as the Atlantic Climatic Episode (Bryson *et. al.* 1970) and the Hypsithermal (Deevey and Flint 1957). These different discussions of middle Holocene climatic change also have different dates associated with them, however, it is agreed that there was a warming trend sometime after 10,000 years ago. The most notable effect of this climate change was a decrease in moisture and increase in average temperature. Many ecozones shifted northward (Ritchie 1976; Wendland 1978) and on the plains the area of short-grass prairie expanded eastward at the expense of long-grass prairie (Reeves 1973:1227-1228). This would have affected the bison population which may have contributed to the change of subsistence pattern seen during this time period.

Subsistence practices in the Middle Precontact period changed from a pattern focused on bison and other big game hunting to a subsistence pattern that utilized a large range of resources including more plant resources and smaller game. This is seen in some parts of the Northern Plains (Walker 1992:130). However, communal bison hunting continued unabated on other parts of the plains such as at Head-Smashed-In buffalo jump (Reeves 1978).

One final notable difference, when compared to the Paleo-Indian period, during this time period is point morphology. Most of the projectile points from this period and onward are smaller, triangular in shape and often have side or corner notches.

2.1.4 Early Middle Precontact Period

The Early Middle Precontact period dates from 7500 – 5000 BP. During this period, in Saskatchewan, a group of side-notched points assigned to the Mummy Cave Series dominate the archaeological material. The series is derived from the sequence of side-notched points found at the Mummy Cave site in Wyoming (Husted and Edgar 2002; McCracken et. al. 1978; Wedel et. al. 1968). Many of the Mummy Cave sites excavated in Saskatchewan date from about 7000 – 6300 BP (Morlan 1993). However, Mummy Cave people may have been in Saskatchewan

earlier as similar material has been dated to as early as 7600 B.P. in other places on the Northern Plains, such as the Mummy Cave site (McCracken et. al. 1978).

Much like the end of the Paleo-Indian period, there are a number of different projectile point types found on the Northern Plains during this time period. Walker (1992:132-142) discusses five projectile point types, in chronological order: Blackwater Side-Notched, Northern Side-Notched, Hawken Side-notched, Gowen Side-notched and Mount Albion Corner-notched. The geographical ranges for these points may not have been the same, but they all seem to be found throughout a significant part of the Northern Great Plains. For a more recent overview of the Mummy Cave Series and other Early Middle Precontanct complexes, see Peck (2011:135-136).

2.1.5 Middle Middle Precontact Period

The Middle Middle period dates from 5000 to 3000 BP. The Oxbow complex is named from the distinctive projectile points that are often said to have an eared appearance. Oxbow complex dates (including Estevan Phase material) range from 4900 to 4100 BP (Peck 2011). The complex was first described on the basis of material excavated from the Oxbow Dam site (Nero and McCorquodale 1958) in southern Saskatchewan.

It has been suggested that the Oxbow Complex developed out of the Mummy Cave series of points (Reeves 1973:1245) with Gowen projectile points being the most likely candidate (Walker 1992:144). Peck suggests that the transitional material be called the Estevan phase (Peck 2011:176-180).

A couple of new cultural practices are found in Saskatchewan during Oxbow period. The first of these is the earliest confirmed use of boiling pits in the province (Peck 2011:191). The second is a one of kind site that is found on the Plains, which consists of a large number of burials in a single location. The Gray site (Millar 1978) had 98 excavated burial units which contained at least 312 individuals. The entire site was not excavated which means that many more burials may be present. No other similar sites are known from this time period. Dates from the site are spread over a long period, ranging from 5,500 years ago to as late as 2,850 years ago. Some caution is suggested about these dates as they were derived from insoluble collagen extraction which Peck (2011:193) points out can cause “aberrantly young dates”.

The next group is the McKean Series which is dated from 5000 to 3200 BP in Saskatchewan (Morlan 1993). The McKean Series was a dominant cultural complex during much of the Middle Middle Precontact period. The series co-occurs in Saskatchewan with the Oxbow Complex in the early portion and Pelican Lake Complex in the later part of the Middle Middle Precontact.

The McKean Series (or Complex as it was originally called) was recognized by Mulloy (1954) based on excavations in Wyoming at the McKean site. The McKean Series is characterized by four different projectile point types: McKean lanceolate, Duncan, Hanna and Mallory. McKean, Duncan and Hanna are all found in Saskatchewan (Dyck 1983) and throughout the Northern Plains. Mallory points are more localized (Davis and Keyser 1999) and have not been recognized in Saskatchewan.

The nomenclature and organization of the McKean series has undergone many changes over the years. Mulloy (1954) originally grouped all the points at the McKean site under the single McKean projectile point type. However, Wheeler (1954) recognized several types: McKean lanceolate, Duncan, and Hanna points. The classification was based on two factors: morphological differences and geographical distribution. Wheeler (1954) recognized that throughout the Northern Plains the different looking projectile points were found together in some sites but not in others.

More recently the McKean Series has gone under further review. Davis and Keyser (1999) determined that there are three valid projectile point types in the series. McKean and Mallory points are considered to still be valid. Whereas, Duncan and Hanna were lumped into a single point type with Hanna points being formed from the reworking/resharpening of Duncan points. Webster (2009:109) mostly agrees with these conclusions, but still suggests caution as some Hanna points in Saskatchewan have straight bases, a trait not found on Duncan points in Saskatchewan.

2.1.6 Late Middle Precontact

The Late Middle Period ranges from 3000 BP to 2000 BP. In Saskatchewan, the Pelican Lake Complex dominates this time period. The Complex is named from material excavated from the Mortlach Site (Wettlaufer and Mayer-Oakes 1955). On the Northern Plains the Pelican Lake Complex dates from 3600 to 2100 if the Bracken and other subphases are included in the

complex (Peck 2011). This puts the beginning part of the Complex during the Middle Middle Period and contemporaneous with the McKean series. There is evidence of interaction between the two archaeological units with McKean points being found in Pelican Lake components (Reeves 1983:82).

The Pelican Lake Complex has been recovered from sites in the Northern Plains and surrounding areas such as the foothills of Alberta (Peck 2011:227-235). Pelican Lake components have been found at communal bison kill sites such as the Head-Smashed-In site in southwest Alberta (Reeves 1978). Other sites contain cooking and roasting pits, grinding stones and plant processing tools (Reeves 1983:87 and 90). However, Reeves (1983:90) stresses that Pelican Lake people never practiced what would be considered a foraging economy even in the southern reaches of the complex's range.

The Pelican Lake Complex is named from the Pelican Lake corner-notched projectile points originally excavated from the Mortlach Site. There is some significant variation in the appearance of the points. Based on size and other morphological differences, Dyck (1983:105) recognized two varieties of Pelican Lake corner-notched points. In contrast, Reeves (1983) sees numerous subphases of the Pelican Lake Complex determined by morphological differences in projectile point styles. These morphological differences are suggested as being found in conjunction with different environmental areas.

Due to the size, morphological and temporal differences, Dyck (1983) suggests that the bow and arrow may have come into use during the middle of the Pelican Lake Complex. The material excavated from the Sjovold Site (Dyck and Morlan 1995) further supports the early appearance of the bow and arrow. An older interpretation was that bow and arrow technology did not appear on the Northern Plains until the Avonlea period (Reeves 1983:77).

2.1.7 Late Precontact Period

The Late Precontact Period dates from 2000 BP to around 200 years BP ending with the arrival of Europeans on the Northern Plains. Pottery first appears on the Northern Plains during this time period. Projectile point types from this time period will be discussed in association with some of the pottery phases found on the plains of Saskatchewan.

The first archaeological phase to be discussed in the Late Precontact Period is the Besant Complex. The Besant Complex on the Canadian Plains is dated from about 2200 – 1500 BP

(Walde et. al. 1995). The material from which the Besant Complex acquires its name was excavated from the Mortlach site (Wettlaufer and Mayer-Oakes 1955). The Besant Complex is the first phase on the Saskatchewan Plains to be associated with pottery. Besant pottery was first described at the Walter Felt site (Kehoe 1964). These conclusions were not accepted for some time (Byrne 1973:449) and it was not until later finds in Saskatchewan, Alberta, Manitoba and adjacent states that it was fully accepted that Besant sites contained pottery (Walde et. al. 1995:17-18). The Besant-like material from North and South Dakota is referred to as the Sonota Complex. The Sonota Complex was differentiated from Besant by the presence of burial mounds and, for a time, the presence of pottery. The Sonota Complex was first described by Neuman (1975). It was originally suggested that Sonota was the mortuary expression of Besant (Dyck 1983:119-115) although it has also been suggest that Sonota is a separate complex (Peck 2011). Besant (and Sonota) was probably engaged in long distance trade with other areas of North America at a scale not seen before on the Northern Plains. One piece of evidence used to suggest this is the preponderance of Knife River Flint found in a significant number of Besant sites (Dyck 1983:115). In conjunction with this large amount of Knife River Flint many other exotic materials such as shells from as far away as the west coast have been excavated from Besant sites (Peck 2011:310).

A subsequent phase of the Late Precontact Period is referred to as the Avonlea Phase. The Avonlea Phase dates from about 1500 to 1200 BP (Walde et. al. 1995). Avonlea projectile points were first excavated from the Long Creek Site (Wettlaufer and Mayer-Oakes 1960). Avonlea points are small and triangular with shallow notches. The peoples of the Avonlea Phase have been suggested as being the first to make extensive use of the bow and arrow (Dyck 1983:122). Like Besant, Avonlea components are often found at communal bison kill sites such as the Old Women's Buffalo Jump (Forbis 1962) and the Gull Lake site (Kehoe 1973), a bison pound. Avonlea made use of mostly local materials unlike the many exotics (e.g. Knife River Flint) found in Besant sites (Dyck 1983:123).

Pottery is found in numerous Avonlea sites. Avonlea pottery is highly variable (Walde et. al. 1995:21). This has led to the suggestion that the Avonlea Phase can be broken down into various regional phases based on the type of pottery. The distribution and specifics of these phases are discussed by Meyer and Walde (2009).

A third type of projectile point found in Saskatchewan during the Late Precontact is called the Late Side-Notched Series (Dyck 1983:126). There are two major projectile point types recognized: Prairie Side-Notched and Plains Side-Notched (Kehoe 1966b). These two point styles are found from about 1150 BP up and into the Historic period, disappearing around 150 B.P (Dyck 1983:126). Plains Side-Notched are slightly better made with squared bases and greater symmetry in shape and position of the side notches. However, pottery types are the best diagnostic artefacts to use during the end of the Late Precontact period. The pottery types are found in limited geographic areas whereas the Prairie and Plains Side-Notched projectile points are found throughout the Northern Plains.

Two phases from this period in Saskatchewan will be briefly discussed. The Old Women's Phase is found extensively throughout the plains of Saskatchewan, Alberta and south into Montana and the Dakotas. Its pottery is referred to as Ethridge Ware and dates from 1200 – 700 B.P. (Walde et. al. 1995:24). Old Women's Phase pottery has been described (Meyer 1988:56) as being thick walled and poorly made, having a globular shape often with a rounded bottom. Shoulders are often present. Decoration is uncommon with punctuates appearing most often when there is decoration on the pot. Like previous occupants of the Plains in Saskatchewan, the Old Women's Phase groups were avid bison hunters, including the practice of communal hunting (Walde et. al. 1995:30-32).

Sites with Mortlach pottery are assigned to the Mortlach Phase. The Mortlach Phase appears after 700 B.P. and is found until the beginning of the Historic Period (roughly 150 B.P.). This pottery is most often found in association with Plains Side-Notched projectile points (Walde et. al. 1995:41). Mortlach pottery is thin and well made with a large variety of decorations. The vessels can have many different profiles: vertical, angled rim, s-rim and wedge rim. Some of the exterior finish includes cord/fabric roughened and check-stamping punctates and other impressions (Walde et. al. 1995:41). Much like Avonlea, there are several subphases of Mortlach which are found in different geographic areas of the Plains leading to diversity throughout the Phase (Walde et. al. 1995:44-45).

2.1.8 Contact Period

The final archaeological period in Saskatchewan is the Contact Period. This period begins with the arrival of Europeans or their goods in Saskatchewan. As this was a gradual

process, the Contact Period does not start at the same time everywhere but a rough date of 200 B.P. is used as a medium point. The end of the historic period is not well defined either, but a good ending point may be somewhere in the early twentieth century. This period includes many things such as Native American sites with metal tools and other obvious European goods, fur trade forts, and homesteads era structures.

2.2 Modern and Paleo-Environment of the Study Area

2.2.1 Modern Environment

Based on difference in vegetation Saskatchewan can be separated into three major regions or zones (Acton et. al. 1998, Fung 1999). The three regions are the boreal forest, prairie and aspen parkland. The boreal forest region covers the northern half of the province while the prairie region covers a large section of the southern half. In between these two regions is the aspen parkland region. The boreal forest and prairie regions can be further divided into sub-regions.

2.2.2 Boreal Forest Region

The northern most area of the Boreal Forest Region is the Subarctic Woodland Sub-region. The area is dominated by open woodland areas intermixed with more tundra like environments. Common trees found in the area include black spruce and jack pine with the open areas covered primarily by lichens. Shrubs and other brush can become common near low lying bog areas. Arctic sedges, willows and other plants can also be found throughout the sub-region (Thorpe 1999:134).

Further south is the Northern Boreal Forest Sub-region. This area is covered in closed forest with predominantly coniferous tree species. Black spruce and jack pine are dominant on uplands with tamarack replacing the jack pine in lower lying areas. Shrubs (e.g. pincherry and bear-berry) and herbs (e.g. pink corydalis and parsley fern) can be found throughout this sub-region in various areas and amounts. Moving south produces a trend with different tree species becoming more common such as trembling aspen, white spruce, and balsam poplar (Thorpe 1999: 134-135).

This trend in tree occurrence, along with other factors, becomes significant enough that more southern areas of the forested region are referred to as the Southern Boreal Forest Sub-region. Other major factors are a change in geology, a more favourable climate and increasingly productive soils (Thorpe 1999:135). The Southern Boreal Forest is a mixed wood area with hardwoods and softwoods being common. This is in contrast to the Northern Boreal Forest Sub-region where only softwoods are found. These different tree species are most often found in large patches of one kind or the other and are attributed to different stages of regrowth after forest fires (Thorpe 1999:135). The shrubs and herbs also vary in the different growth patches based on the types of trees found in the area. Prickly rose and bush-cranberry are common shrubs with sarsaparilla, dewberry and fireweed being common herb species. Increased canopy cover will reduce the amount of shrubs and herbs found leading to feather-mosses dominating the low lying vegetation. Overall it is a complex sub-region with considerable physiographic variety. The southern edge of the sub-regions shows many changes associated with the Aspen Parkland such as fewer conifers and pure aspen stands (Thorpe 1999:135-136).

2.2.3 Aspen Parkland Region

The Aspen Parkland Region's most notable distinction is the continuous gradation of vegetation. In the northern portion of the region most of the landscape is wooded with minimal grassland cover. As the latitude moves southward, grassland cover increases until heavily wooded areas are limited to uplands, e.g. Moose Mountain (Thorpe 1999:136). Trembling aspen is the dominant tree, while in the southern portions of the zone it is found in small stands with various brush species, such as snowberry and saskatoon berry. The dominant grass is fescue with other types becoming more common in the southern portions of the region (Thorpe 1999:136).

2.2.4 Prairie Region

The Prairie Region is split into three different sub-regions. Mixed Prairie and Dry Mixed Prairie Sub-regions make up the bulk of the region. The third sub-region is the Cypress Hills Sub-region. The Mixed Prairie Sub-region consists of the northern part of the Prairie Region, but curves southward to the east down to the southeast corner of the province. Aspen groves can be found, but grass makes up over 99% of the vegetation cover in this sub-region. The different grasses found in this sub-region consist of shortgrasses and midgrasses. Northern

wheat grass, porcupine grass, and western wheat grass are common midgrasses. The most common shortgrass is blue grama. Sedges that are grass-like in appearance are also common such as low sedge and sun-loving sedge. In lower wetter areas, bushes such as chokecherry, saskatoon, and hawthorn are common. The greatest diversity in this region is provided by valley complexes such as the one created by the South Saskatchewan River (Thorpe 1999:136-137).

The Dry Mixed Prairie Sub-region is found throughout parts of the southwestern portion of the province. This sub-region is dominated by midgrasses that are adapted to drier environments, and although the same grasses are found in the Mixed Prairie Sub-region they are more common in this sub-region. One such grass is needle-and-thread. The shortgrass blue grama is also more common, but is not as dominant as in the shortgrass prairie found farther south. Sagebrush becomes common in this sub-region (Thorpe 1999:137).

The final sub-region is the Cypress Hills. Although there are other upland regions throughout the prairie region, the Cypress Hills is large enough and distinct enough that it can be seen as a separate sub-region (Thorpe 1999:137). Fescue prairie is the dominant grass and Aspen groves are common. Conifers (white spruce and lodgepole pine) can also be found. It is the only place in Saskatchewan that lodgepole pine occurs (Thorpe 1999:137). Other foothill species from the Rocky Mountain Foothill zone can also be found here, e.g. silvery lupine and shining-silvery lupine (Thorpe 1999:137).

2.2.5 Paleo-Environmental Considerations

The environment of Saskatchewan, during the time period that the Cody Complex occupied the region (10,000 – 8500 years ago), was not the same as it is today. Around 10,000 years ago, much of the extreme northern part of the province was still covered in glacial ice and the water of glacial lakes (Figure 2.2). After this the ice and water began to recede, and by around 9000 years ago most of the southern part of the province would have been available for habitation (Figure 2.3). The vegetation would not only have been different from the modern environment, but would have changed over the period that the people of Cody Complex occupied southern Saskatchewan. The amount of paleo-environmental data for this time period in Saskatchewan is limited. As a result, proxy data from other Northern Plains regions is incorporated in this overview.

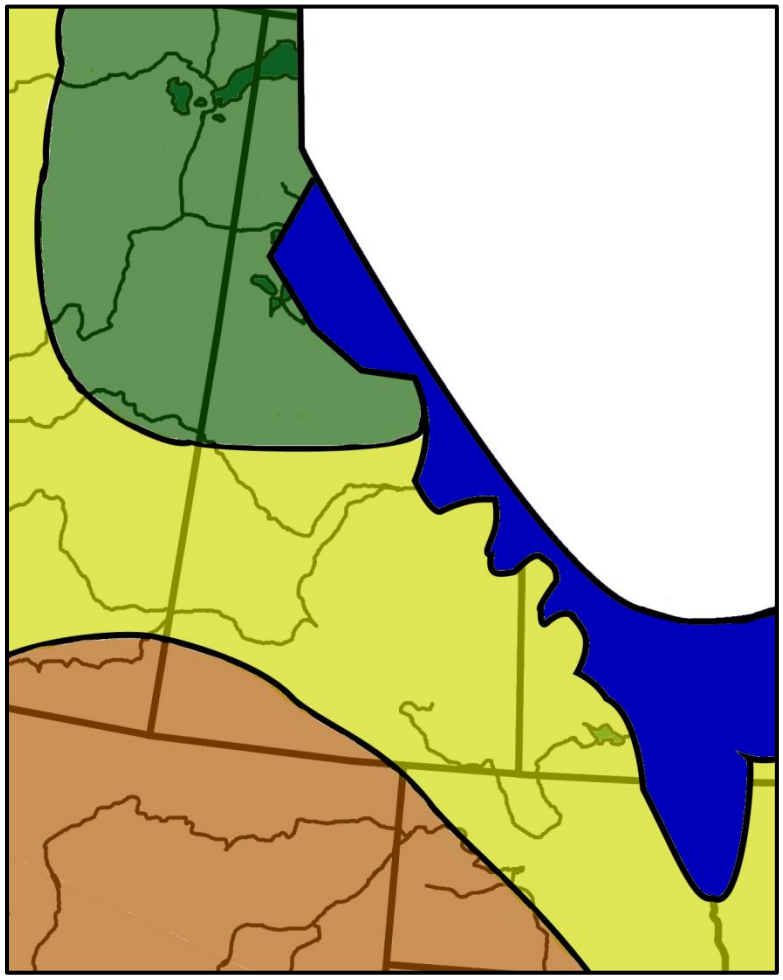

Figure 2.2. Ice, water and vegetation coverage around 10,000 years ago. White = ice, blue = water, Green = closed boreal forest, yellow = open boreal forest and brown = prairies.

One of the earliest dates associated with the Cody Complex is 9820 ± 160 years ago (TO-1097); this date is associated with Alberta projectile points at the Hudson-Meng site in western Nebraska (Agenbroad 1978a:150). This date is important because it means that the Cody Complex might be present in Saskatchewan at this time. The vegetation in much of southern Saskatchewan would have been favourable for habitation as it was covered by a forest (Yansa 2006). The forest during this period was dominated by spruce with early interpretations suggesting there were limited grass and herb communities (Ritchie and de Vries 1964; Ritchie 1976). However, more recent work (Yansa and Basinger 1999; Yansa 2006) has shown that what was thought to be a closed forest was in fact a parkland environment. Yansa and Basinger (1999:144) found significant amounts of pollen from light-demanding shrub and herb plants, indicating that it was unlikely the landscape to have been covered by a closed spruce forest.

Further evidence for a parkland environment is provided by fossil remains of large grazers such as extinct forms of bison and mammoths (Dyke 2005:229). Beaudoin (1999:11) suggests a similar spruce forest existed in parts of central Alberta.

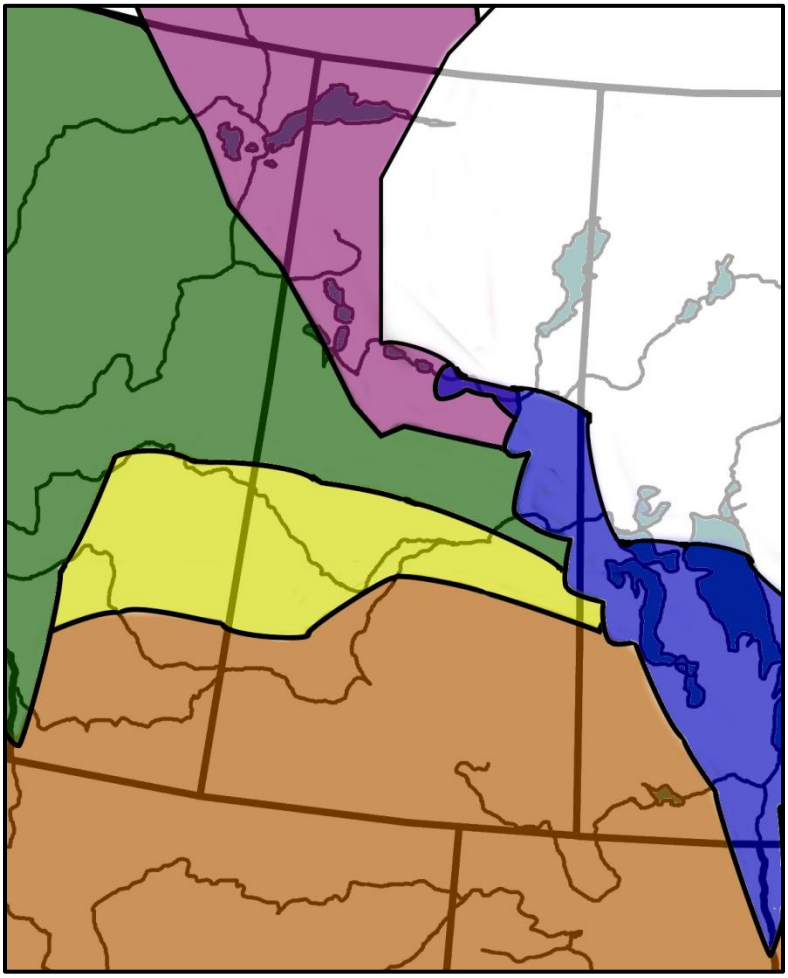

Figure 2.3. Ice, water and vegetation coverage around 9000 years ago. White = ice, blue = water, green = closed boreal forest, yellow = open boreal forest, brown = prairies and purple = tundra.

Shortly after 10,000 years ago the forest begins shifting northward and changing in composition. The northern portion of this forested area changed from a parkland environment to a closed forest (Dyke 2005:228). However, in the southern portion of the forest poplar and birch become the dominant trees (Yansa 2007). A deciduous forest was established in Saskatchewan by 9,980 years ago (Yansa 2006:270). Faunal remains from Alberta support that this deciduous forest was parkland-like, much like the previous spruce dominated vegetation (Beaudoin and

Oetelaar 2003:200). Pettipas (2011:56-57) suggests that in Manitoba the deciduous parkland was established at about the same time.

The subsequent vegetation region in the southern areas of Saskatchewan is one that is much closer to the modern day vegetation, one that is dominated by grasses. The earliest direct date for grasslands in southern Saskatchewan is a date of 8,800 years ago (Yansa 2008; Yansa and Basinger 1999:150). This information is based on evidence of burning from the Andrew site in southern Saskatchewan (Yansa 2007:130). Ritchie (1976:1810) suggests that the very southern portion of Saskatchewan shows signs of grasslands as early as 10,500 years ago and that by 9,500 years ago these grasslands were well established and covering about half of the province of Saskatchewan (Ritchie 1976:1810 Figure 8). By 9,000 years ago, if not earlier, the grasslands in Saskatchewan would have reached the shores of Glacial Lake Agassiz (Dyke 2005:231).

Like the other vegetational phases, grasslands appear sooner in more southern locations. In Montana, grasslands were well established shortly after glacial retreat at roughly 12,200 years ago (Barnosky 1989:69). The early grasslands in Montana were temperate but by 11,500 years ago had been become drier and closer to modern day grasslands (Barnosky 198:69). Drought conditions began sometime between 9500 and 9300 years ago (Barnosky 1989:70). However, data suggest that in North Dakota grasslands were not well established until 9,500 years ago (Yansa 2007:130). Pettipas (2011:57) suggests that the grasslands were also in Manitoba at 9,500 years ago and by this time and they were already nearing the waters of Glacial Lake Agassiz.

The data for Manitoba are limited with most of the work being done on lakes in upland areas such as the Riding Mountain Area of west central Manitoba (Ritchie 1964). Ritchie (1964) suggests a spruce forest, grassland, deciduous forest (similar to the modern vegetation of the area) succession of vegetation. Unfortunately, no dates from the locations examined are provided to indicate when these different vegetational groups are present. However, other work by Ritche (1976) suggests that southwest Manitoba was covered by grasslands as early 9,500 years ago. In southeast Alberta, the grasslands are established slightly later than in Saskatchewan, at about 9,000 years ago (Beaudoin 1999:13).

Overall the data suggests that at least by 10,000 years ago most of Saskatchewan was open to human habitation. At this time, most of the province was covered in an open forest dominated by spruce trees with grassland found in the southwest. In light of this parkland

habitat, large game species such as bison would have been common. Around 9,500 years ago grasslands were well established in Saskatchewan and may have stretched as far northeast as the shores of Glacial Lake Agassiz. Although the boreal forest moved northward, it was still open and more southern portions of the forest show evidence for many deciduous trees. By 9,000 years ago the grasslands were well established appearing as far north as their modern day position. The area around the shores of Glacial Lake Agassiz was covered in grassland and the boreal forest was mostly a closed forest by this time.

By 8,500 years ago, the vegetation in Saskatchewan was probably similarly organized as modern day Saskatchewan. This pattern includes boreal forest in the north with a large parkland region between it and the grasslands covering the south part of the province. However, due to warmer temperatures than today the northern boundaries of the grasslands and boreal forest were farther north than the present day.

Chapter 3 Overview of the Cody Complex

3.1 Introduction

The Cody Complex is a Paleo-Indian Complex found throughout the Great Plains of North America. It occurs from the Northern Plains of Alberta and Saskatchewan all the way south to Texas. It can also be found in neighboring regions such as the boreal forest of Alberta, throughout the foothills and mountain areas of the Rocky Mountains, and even into the Great Basin (Pitblado 2003; Wormington 1957:123). As an archaeological unit, the Cody Complex is composed of numerous diagnostic materials including several different projectile point types and asymmetrical bifacial knives. Other lithic tools are also associated with the complex including spurred end-scrapers, drills and gravers.

On the Northern Plains, the Cody Complex consists of three major projectile point styles: Alberta, Scottsbluff (types I and II), and Eden points (Figure 3.1). These points are all associated with asymmetrical bifacial knives called Cody Knives. Several different names (Firstview, San Jon, Kersey, and Portales) have also been used to describe Cody-like points from sites from southern portions of the Great Plains.

3.2 Beginnings of the Cody Complex

The name Cody Complex was first proposed by Jepson (1953a; 1953b) to describe the material from the Horner Site. A distinct type designation was preferred over the catch all term "Yuma," which had been used to describe any large lanceolate points, and their associated materials, that were not Clovis or Folsom. Jepson (1953a; 1953b) did not provide much information on the material found at the Horner Site and it was not until later work by

Figure 3.1. Cody Complex point types from Saskatchewan. A) Alberta, B) Scottsbluff Type II, C) Scottsbluff Type I and D) Eden.

Wormington (1957) and Frison and Todd (1987) that the material from the Horner Site was thoroughly examined. Two projectile point types, Scottsbluff and Eden, were originally attributed to the Cody Complex (Wormington 1957:127-128). The projectile points described as Scottsbluff style were first excavated from the Scottsbluff Bison Quarry in west-central Nebraska in 1932 (Barbour and Schultz 1932). Wormington (1957) recognized two types of Scottsbluff projectile points:

> "Type I – Points with somewhat triangular or parallel-sided blades, small shoulders and broad stems. The flaking is usually of the transverse parallel type, but it may be more irregular. The cross-section is a thick oval. The stem edges are usually ground. The range in length is from two to five inches. Most specimens are between three and four inches long and about one inch wide. Many of those that are less than three inches long compared with the longer specimens in breadth and may represent points that were reworded after the tips had been broken." (Wormington 1957:267)

> "Type II - Points that Resemble Type I but have wider triangular blades, are thin and lenticular in cross-section, and have more clearly defined shoulders." (Wormington 1957:267)

Eden projectile points were named from material excavated during the early forties from the Finley Site located in the Eden Valley, located in southwest Wyoming (Moss 1951). Eden points are described as:

> "Points that resemble the Scottsbluff types, but which are narrower relative to their length. The insets that produce the stems are very slight; in some cases the apparent stemming may be only the result of pronounced basal grinding. Most Eden points are characterized by collateral flaking and have pronounced median ridges and a diamond-shaped cross-section… In rare cases the flaking is of the transverse parallel type and the median ridges are less clearly marked. … Those found in the Plains area of the United States are usually three to four and a half inches long and one half to three quarters of an inch wide. Eden points of similar size occur in the Prairie Provinces of western Canada, but some specimens have been found there that are as little as two inches long and five sixteenths of an inch wide." (Wormington 1957:267)

Another diagnostic tool associated with the Cody Complex are Cody Knives (Figure 3.2), an asymmetrical bifacial knife. The knives were originally best known from the Horner Site near Cody, Wyoming, and they are described as:

> "Knives with transverse blades that are usually shouldered on one side, but are sometimes characterized by a parallel-sided base without an inset. There is virtually no published information on this type and it is difficult even to estimate the size range, but most of the specimens seen by the writer have been two or three inches long." (Wormington 1957:267)

Figure 3.2. Cody Knives made from Knife River flint from the Niska site in Southwest Saskatchewan.

3.3 Changes to the Complex

Beside the Scottsbluff, Eden and the Cody Knives, other names have been applied to square stemmed lanceolate points of similar age over the years. The most important addition to the Cody Complex, for the Northern Plains, is the inclusion of Alberta projectile points. Alberta points were first named by Wormington (1957:134) based on surface finds from Alberta. She recognized them as being similar to Scottsbluff, but "they are larger, the stem is longer, the base is slightly convex, and the tip is somewhat blunted" (Wormington 1957:134). She also suggests that there may have been some sort of relationship between the two points. This relationship was confirmed when a Cody Knife was excavated in association with Alberta projectile points from the Hudson-Meng site in northwestern Nebraska (Agenbroad 1978a; 1978b). Since this discovery, Alberta material has been considered part of the Cody Complex although Alberta points are not found in the same components of sites as Scottsbluff-Eden material.

3.3.1 Scottsbluff/Eden-like Material

Several different designations have also been used to describe Cody Complex-like material from more southern regions of the Great Plains. One of these designations was Kersey, which was the name given to material excavated from the Jurgens Site, northeastern Colorado (Wheat 1979). The site is dated to 9070 ± 90 B.P. (SI-3726) (Wheat 1979:151) which is well within the date range for the Cody Complex. The use of Kersey to describe Cody Complex-like material has been limited to the Jurgens assemblage. Similar material to the Jurgens Site has been excavated from the Frasca Site, northeastern Colorado (Fulgham and Stanford 1982). However, it has been suggested that the term Kersey should be discarded and that Scottsbluff, Eden or Cody Complex be used to describe the material from the Jurgens and nearby sites (Fulgham and Stanford 1982:9).

The Portales Complex is another term that has been used to describe Cody Complex-like material. Much like Kersey, the validity of the term has been challenged over the years and the term has fallen out of use. The Portales Complex was first used to describe material from Horizon 5 at the Blackwater locality No. 1 site in east-central New Mexico (Sellards 1952:72-75). The Portales Complex was described as containing Scottsbluff, Eden, Plainview and San Jon points.

Eventually, doubts where expressed about the validity of the Portales Complex (Agogino and Rovner 1969), including the fact that different aged material was mixed in with Cody material (Buchanan et. al. 2007). A more recent examination of the bonebeds and lithic material from Blackwater locality No. 1 has determined that "the 'Portales Complex' clearly has outlived its usefulness and is not valid" (Johnson and Holliday 1997).

Wheat (1972) proposed another complex with material that was much like typical Cody Complex points. This new complex was termed the Firstview Complex. There were two Scottsbluff-like points attributed to the Firstview Complex; Firstview and San Jon projectile points. Also included in the complex were Plainview and Milnesand projectile point types, both of which are un-stemmed and not linked to Scottsbluff and Eden points anywhere else. San Jon points were first named from the San Jon site in east-central New Mexico (Roberts 1942). San Jon points were subsequently reported as being found at a few sites including the Olsen-Chubbuck site, located in eastern Colorado. The Olsen-Chubbuck site, discussed further below, is the Firstveiw projectile point type site (Wheat 1972). San Jon points are described as:

> "…somewhat variable, but which is characterized in general by relatively short and narrow, thick bodies without shoulders, or with very small ones, which when present, are produced in part by chipping and in part by heavy edge-grinding. Bases range from very slight concave to slight convex, but most are straight. …most bases are somewhat wedge-shaped. Stems, when present, are squarish, … Cross-section vary from lenticular to a flattened diamond shape. The workmanship of these points, while very good, is generally not so fine as that of the first group, the flaking being somewhat more irregular. Length ranges from 42.5 to 62.5 mm; width from 15.4 to 22.8 mm; and thickness from 6.0 to 8.5 mm." (Wheat 1972:125-126)

Wheat (1972:145) argues that San Jon points are slightly different from Scottsbluff type I and Eden points. However, he acknowledges that there is overlap between the San Jon and these other points. He further suggests that Scottsbluff/Eden points are more restricted to the Northern Plains, whereas San Jon points are found in the Southern Plains almost to the exclusion of the other Cody Complex-like points. Wheat (1972:153) redefines a large number of sites originally

identified as Cody Complex sites. These sites were placed into the Firstview Complex and the points reidentified as San Jon points. One of these sites was the Finley site, the Eden type site. More recent studies have disagreed with these conclusions (Knudson 1995; Hill et.al. 1995).

Even before conclusions were drawn from the work at the Olsen-Chubbuck site, the validity of the San Jon type, which was based on a single projectile point, was questioned (Wormington 1957:113). However, it was not until much later that full review of the material excavated from the San Jon site was undertaken (Hill et. al. 1995). This re-evaluation concluded that the San Jon points were reworked lanceolate points and they were reclassified as being Firstview points (Hill et. al. 1995:383).

In conjunction with this study, Knudson (1995) examined the Paleo-Indian points from the San Jon site. She also concluded that the San Jon point style was invalid. Knudson (1995:394-396) also suggests that care should be taken when trying to name point styles based on information from a single site especially when it contains very few specimens. Based on the information presented by Hill et. al. (1995) and Knudson (1995), San Jon material has since been considered part of the Firstview point type. However, these errors were recognized much earlier. Wheat (1975), shortly after his initial work at the Olsen-Chubbuck site eliminated San Jon points as a valid type in the Firstview Complex.

As mentioned above, the type site for Firstview points is the Olsen-Chubbuck Site (Wheat 1972). Firstview points are described as:

> "…basically lanceolate or leaf-shaped, full-bodied points, with stems, when present at all, produced only be heavy edge-grinding. Bases are predominantly straight, but a few are slightly concave or convex and tend to be wedge-shaped. They range from relatively broad points with flattened lenticular cross-sections to relatively narrow points with a median ridge occasionally approaching a diamond-shaped cross-section. All of the points have convex edges which tend to expand gently from the base to about mid-point, from where they curve to a relatively sharp point… They are rather uniform in length, ranging from 65 to 82 mm; but range in width from 17.7 to 27.5 mm, and in thickness, from 6 to 8.9 mm." (Wheat 1972:125).

Firstview projectile points have been recognized at several sites in the Southern Plains, such as Blackwater Locality No.1 (Agogino et. al. 1976) and Lubbock Lake (Holliday et. al. 1983). The Firstview material at Lubbock Lake dates much later, around 8000 years ago (Holliday et. al. 1983), than the earlier dates at the Olsen-Chubbuck site, around 10,200 years ago (Wheat 1972:156). The date from the Olsen-Chubbuck site had been considered suspect (Agogino et. al. 1976) and a newer date of about 9400 years ago has been reported (Hofman and Graham 1998). This change in date is important as the earlier date was one of the reasons for the creation of the Firstview Complex. As a result, Agogino et. al. (1976:221) suggests that the Firstview Complex is invalid. However, they do recognize the existence of Firstview projectile points and that they belong as a member of the Cody Complex.

There are two final types of projectile points attributed to the Cody Complex. These have been called Alberta/Cody I and Alberta/Cody II projectile points (Bradley and Frison 1987). Alberta/Cody I are widest at the shoulder tapering toward the tip. Shoulders are well defined and range in shape from squared to slightly rounded. The distinct stems are parallel or converge slightly toward the base which are straight to slightly convex. They are lenticular in cross-section with flaking that is "consistently well-controlled, transmedial, selective pressure" (Bradley and Frison 1987:204).

Alberta/Cody II are relatively narrow when compared to type I. The widest point is found at the shoulders which are rounded. The distinct stem is parallel to the base which are slightly convex. The cross-section is lenticular with flaking that is in a well controlled serial pattern with comedial terminations. The major difference between Alberta/Cody type I and type II points is in the production technology (Bradley and Frison 1987:206). It is suggested that the same production process was used to produce both types with different termination points in the sequence. There were different modifications performed in the final step.

These points are considered typologically and technologically intermediate between Alberta and Scottsbluff/Eden points (Bradley and Frison 1987:207). This is the reason why the name Alberta/Cody has been assigned to them. The type I specimens are considered a Scottsbluff (type I) style of point while type II are similar to the Eden style. Cody knives were associated with these points. Most of these Alberta/Cody points were found in the Horner II bonebed but some were identified in the Horner I bonebed. A large number of more traditional Cody Complex points (Scottsbluff and Eden) were also excavated from the Horner I location.

3.3.2 Current considerations of the Cody Complex

As discussed above, there is a considerable amount of variation within the Cody Complex. At least ten different designations have been assigned to projectile point types associated with the Cody Complex. Some are no longer considered valid, but there are still several designations used to describe lanceolate square stemmed projectile points.

A replication study (Bradley and Stanford 1987) was conducted to try and determine how the variation in these lanceolate square stemmed projectile points was produced. The replicated material was compared with excavated material, specifically the Cody Complex material from the Claypool site, northeast Colorado (Dick and Mountain 1960; Stanford and Albanese 1975). Also, some less detailed comparisons were made to points from other Cody Complex sites.

This study divided the characteristics of projectile points into two categories. The first category consisted of the major technological features which would have been influenced by "social/cultural standards" (Bradley and Stanford 1987:411). This includes the basic reduction system and the general outline and dimensions of the projectile points. The second category is made up of minor features and would have been controlled by the individual flintknapper's behaviours. This includes when to terminate the reduction sequence, as well as small variations in proportions, edge retouch and finishing techniques. These secondary features can also be influenced by the material, including its type and any flaws that may be present in the material (Buchanan et. al. 2007:284).

The study (Bradley and Stanford 1987) determined that all the different projectile points, Scottsbluff type I, II, Eden, and Firstview of the Cody Complex could be produced using the same reduction strategy. Scottsbluff points were stopped at an earlier stage of reduction whereas Eden points would undergo more reduction stages before being finely retouched and stemmed. Numerous different approaches to stemming are described (Bradley and Stanford 1987), and since this is a secondary choice, it would vary from flintknapper to flintknapper and site to site. It is also noted that the asymmetrical bifacial knives (Cody Knives) are produced in a similar fashion.

The conclusions of the study were that the Cody Complex is made up of a large number of points which were terminated at different stages of reductions and then stemmed differently. The study used the example of the Olsen-Chubbuck site, and specifically the Firstview material recovered from it (Bradley and Stanford 1987:428). It was concluded that there was the same

amount of variation between the points at the Olsen-Chubbuck site as the points at the Claypool Site. Projectile points in both sites were stopped at the same stage in the reduction sequence as the other points in the site. It was also determined that the reduction sequence was terminated at the same stage at both sites. The major difference between the two sites was different stemming techniques used to finish the projectile points. The Cody Complex, as expressed by the projectile points, may be best described as:

> "…the Cody 'cultural' pattern included production of slightly stemmed, square-based, lanceolate points using a fairly standardized multi-stage reduction strategy, and the individual stone-workers interpreted this basic pattern in terms of their own individual skills and preferences" (Bamforth 1991b:316).

This would suggest that the Cody Complex is composed of large continuum of point styles. These points all follow a few standardized concepts:

- Fairly consistent lanceolate shape (when not reworked)
- Square based stems
- Multi-stage reduction strategy
- Finished by marginal retouch and basal margin grinding

The last reduction stage was determined by the individual knapper based on desired form, urgency with which the points were required, and constraints due to raw material and/or flaking mistakes (Bradley and Stanford 1987:417). Stem production would also be determined by the individual knapper. The final form of the stem would probably be made so that it would fit in a haft. Based on the final stage of reduction and the size of the haft, this could involve just grinding or a much greater removal of material. It has been noted that it is much easier to work stone into the desired dimension than the wood or bone used to haft the point (Bradley and Stanford 1987:423).

Many of the different projectile point types associated with the Cody Complex have been recovered from large kill sites such as the Horner site or Olsen-Chubbuck. This factor,

combined with the individual knappers' decisions during point production, may be one of the major factors leading to the numerous different names being assigned to Cody Complex material. It has been suggested that as few as one or two individuals may have been responsible for the production of most of the projectile points at communal kill sites (Bamforth 1991b:311-312). However, this does not mean that the names assigned to Cody Complex points (e.g. Scottsbluff I and II and Eden) are invalid and have no worth.

As early as the creation of the Complex, the blurred nature of the points were recognized, including the uncertain value of the different point types (Wormington 1957:136). Certain styles may only be found during specific time periods or distributed over a certain geographic area. For example, if Alberta/Cody points were identified at more locations it may be determined that by age and appearance they really are transitional between Alberta and Cody Complex points. Or perhaps as Wheat (1972) suggests, the Firstview style of points are indeed found in the more southern portions of the Plains and the Eden style was limited to the northern portions. Only more information can reveal if there is any temporal or geographic distribution of the more specific Cody Complex point types. However, it has been stated that there is no justifiable reason for splitting the Olsen-Chubbuck or other materials discussed above from the Cody Complex (Bradley and Frison 1987:225) and that they are all Cody Complex points (Bradley 1993:259).

The major exception to this are Alberta points. Alberta points are finished with percussion flaking instead of pressure flaking (Bamforth 1991b:316). It is possible that they were produced with a reduction sequence similar to Scottsbluff and Eden points but just terminated at a much earlier stage and not as finely finished. Also the dates (discussed below) suggest that there may be a temporal difference between Alberta points and the other points of the Complex. However, Alberta points have been found in partial association with Scottsbluff points at the Fletcher site (Forbis 1968) and Alberta points are well accepted as belonging to the Cody Complex.

Based on this information, the Cody Complex can be described as a complex consisting of squared stemmed lanceolate points that are produced via a multi-staged reduction sequence with different points of termination in the sequence that yield diverse projectile point types. These types include Alberta, Alberta/Cody I, Alberta/Cody II, Scottsbluff I, Scottsbluff II, Eden and Firstview types. Some, or perhaps all, of these types may have distinct temporal and

geographic ranges. The one constant found associated with the Complex and all the different point types is the presence of Cody Knives.

3.4 Temporal and Geographic distribution of the Cody Complex

The earliest member of the Cody Complex is the Alberta projectile point type and associated material. There is only one known excavated site in Canada that has a well associated Alberta component; the Fletcher Site, in southeastern Alberta. Other sites have possible Alberta components but the association is often unclear or tenuous at best. Peck (2011:69-75) has a list of these other potential Alberta sites. In Saskatchewan and Manitoba, Alberta points have only been recovered on the surface. This situation makes determining the age of Alberta material in Saskatchewan difficult.

The Fletcher site contained numerous Alberta points that were excavated *in situ* in association with a bonebed (Forbis 1968). Several Scottsbluff points were also recovered from the site; however, they were recovered from the surface and not the excavation. Originally, no radiocarbon dates were obtained so only a tentative date based on geology could be assigned to the site. It was suggested that the site could have been older than 10,000 years old but no younger than 7,000 years old. As this time period covers a generous portion of the Paleo-Indian period, it is not very helpful in narrowing down the age of Alberta material in Canada. However, more recently an AMS date of 9380 ± 110 B.P. (TO-1097) was obtained from the Fletcher site (Vickers and Beaudoin 1989:264). This early date is considered acceptable as the Alberta and Scottsbluff points are heavily associated at the Fletcher site. A pure Alberta component, such as at the Hudson-Meng site (discussed below) would be expected to have a later date (Vickers and Beaudoin 1989:264).

Alberta points were also excavated from the Hell Gap site in east-central Wyoming (Irwin-Williams et. al. 1973). No dates from this site were associated with the Alberta component. The Alberta material was considered to be above the Hell-Gap material and below a Scottsbluff/Eden level. However, a reassessment (Sellet 2001) of the Hell-Gap site suggests that using the dates from these materials to relatively date the Alberta material is questionable. The reassessment shows that there was considerable overlap in time and space between the components at the site.

Another site that has yielded radiocarbon dates associated with Alberta material is the Hudson-Meng Site in northwest Nebraska (Agenbroad 1978b). Three dates were obtained, two of them on bone, 8990 ± 190 B.P. (SMU-52) and 9380 ± 100 B.P. (SMU-102). The third date, 9820 ± 160 (SMU-224) was based on charcoal flecks that were collected throughout the excavation and is considered the most reliable (Agenbroad 1978b:116). Overall, the data for the age of the Alberta portion of the Cody Complex is minimal. It would suggest that the Alberta material on the Northern Plains, including Saskatchewan, dates between 10,000 to 9000 years B.P.

The next oldest part of the Cody Complex would be the transitional material, Alberta/Cody I and Alberta/Cody II, described from the Horner Site (Frison and Todd 1987). Alberta/Cody material was found in both assemblages, the Horner I bonebed and Horner II bonebed, recovered from the site. Horner II material was classified as Alberta/Cody, whereas the material from Horner I was a mix of Alberta/Cody and Scottsbluff/Eden points. There were four radiocarbon dates from the site that were considered acceptable and directly associated with cultural material (Frison 1987:105). The Horner II bonebed had two dates of 9875 ± 85 B.P. (SI-4851A) and 10,060 ± 220 B.P. (I-10900). The Horner I bonebed had two acceptable dates of 8750 ± 120 B.P. (UCLA-697A) and 8840 ± 140 B.P. (UCLA-697B). This suggests that the Horner II bonebed was about 1000 years older than the Horner I bonebed and means that Alberta/Cody material was present by about 10,000 years ago. If true, this would put the Alberta/Cody material at a date that would allow it to be transitional between Alberta and the other Cody Complex material.

The mixing of point types in the Horner I bone bed makes placing an end date for Alberta/Cody material difficult as the dates from this bone bed match up very well with traditional Cody Complex dates. It has been noted that most of the Eden, Scottsbluff and Alberta/Cody points were found in discrete areas of Horner I (Frison et. al. 1987:365). It has been suggested that this may be due to different groups being at the location and leaving behind different projectile points (Frison et. al. 1987:365). Another option would be different groups using the site at different times. This could be possible since it has also been suggested that the site is multi-component (Frison et. al. 1987:364). Due to issues like this Alberta/Cody material will have to be identified at other sites to give it a more definite date and to help determine what sort of geographic area it may encompass.

In contrast to Alberta and Alberta/Cody material, the other projectile point types of the Cody Complex have been dated at numerous sites throughout the Great Plains. This includes the Scottsbluff, Eden and Firstview types. Due to a greater abundance of stratified sites, and Cody Complex sites in general, there are more dated components from the southern half of the Plains. Two of these stratified sites are Lubbock Lake in western Texas and Blackwater Draw, in east-central New Mexico.

Lubbock Lake has had an extensive number of radiocarbon dates taken from the site (Holliday et. al. 1983; Johnson and Holliday 1987). The number of dates that can be associated with the Cody Complex is minimal when compared to the many taken from throughout the site. Two radiocarbon dates, 9883 ± 350 B.P. (C-558) and 7765 ± 200 B.P. (L-283H), were obtained on bone (Holliday et. al. 1983:175). Both were discarded, the first due to the large standard deviation and the second date because it was aberrant compared to other dates from the same level. These dates are not considered in the list of reliable radiocarbon dates from the site (Johnson and Holliday 1987). Two other dates associated with the Cody Complex where also obtained from the site. A reliable date of 8655 ± 90 B.P. (SI-4177) from humin just below the Firstview material and another one of 8210 ± 240 B.P. (SMU-830f) from just below an A horizon associated with the Firstview material. This gives the Cody Complex material at the Lubbock Lake site an age range of 8700 to 8000 years ago.

What has been referred to as the Clovis site is a collection of different localities in a small area around Blackwater Draw (Sellards 1952:29). Some of the locations have Cody Complex components. At Blackwater Draw Locality No. 1, the Firstview component was dated to 8570 ± 350 B.P. (A-512) (Haynes and Agogino 1966:817). Further work at other localities, such as the Evans bonebed, has resulted in similar dates. Two dates, 8690 ± 70 (SMU-1671) and 8970 ± 60 (SMU-1672), were obtained on humic acid from soil around the bone (Johnson and Holliday 1997:337).

Two sites, Olsen-Chubbuck and Jurgens in Colorado produced an abundant amount of Cody Complex material. One date of 10,150 ± 500 B.P. (A-744) was obtained on bison hoof bones (Wheat 1972:156). The date at the Olsen-Chubbuck site is considered suspect and the method used produced a later date than it should have (Agogino et. al. 1976:221). A newer set of radiocarbon dates has been run on bone from the site and these cluster around 9400 years ago (Hofman and Graham 1998:112).

At the Jurgens site, a date of 9070 ± 90 B.P. (SI-3726) was obtained on charcoal. There are also a couple of other Cody Complex sites from Colorado that have been dated; the Frasca Site in northeastern Colorado, has a date on bone of 8910 ± 90 B.P. (SI-4535) (Fulgham and Stanford 1982). The Lamb Spring Site, central Colorado, had two radiocarbon dates obtained on bone of 8870 ± 350 (M-1463) and 7870 ± 240 B.P. (SI-45) (Rancier and Stanford 1982). There may have been contamination with the second sample to have produced such an early date when compared with the first one (Rancier and Stanford 1982:12). The dates from these sites in Colorado indicate that people belonging to the Cody Complex was present in the area from around 9500 to 8500 years ago or perhaps even until about 8000 years ago. The later dates from Colorado also match up well with the dates from farther south in New Mexico and Texas. These dates also compare well with the date of about 8700 years ago associated with Cody Complex material from the Hell Gap site in southeastern Wyoming (Irwin-Williams et. al. 1973:50).

Wyoming has a number of other Cody Complex sites that have dates associated with them. In southwest Wyoming, the Finley site, the Eden type site, has two radiocarbon dates of 8950 ± 220 B.P. (RL-574) and 9026 ± 118 B.P. (SMU-250) (Frison 1978:23). Northern Wyoming has two Cody Complex sites with reliable dates. The Medicine Lodge Creek site has a date of 8830 ± 470 B.P. (RL-446) associated with probable Cody Complex material (Frison 1976). The Horner site has two dates, 8750 ± 120 B.P. (UCLA-697A) and 8840 ± 140 (UCLA-697B) B.P. that can be attributed to the traditional, Scottsbluff/Eden, Cody Complex material (Frison 1987:104-105). Most of the Cody Complex material in Wyoming dates to around 9000 years ago which matches up consistently with the middle of the range of dates seen further south.

There are a couple of sites in the northern states and provinces including Saskatchewan that have dates associated with Cody Complex material. The MacHaffie II site in north-central Montana has a date of 8100 ± 300 B.P. (L-578a) (Knudson 1983:188). When compared to most dates of other Cody Complex sites, from more southern areas, the MacHaffie II date is significantly later. When compared to some other sites such as the Niska site in Saskatchewan the date from the MacHaffie site may not be so abnormal.

In eastern North Dakota, a large Cody Complex lithic workshop has been dated. Three dates, 8700 ± 70 B.P. (SMU-1282), 8910 ± 70 B.P. (SMU-1271) and 8000 ± 80 B.P. (SMU-1307), from the Benz Site are associated with Scottsbluff projectile points (Root 1992). The 8000 date is from the same level as the 8910 date which are below the level with the 8700 date. The

Cody Complex material is suggested as being deposited on a soil that can be no younger than 8600 years old (Root 1992:178) which would suggest that the 8000 year date should be rejected.

In Alberta, the only Cody Complex site with a date is the Fletcher site. As discussed above, the material is younger than about 9400 years ago. A more specific date is not available for material from the site. In Saskatchewan, two Cody Complex sites have radiocarbon dates. the Heron-Eden site produced five dates: 10,210 ± 100 B.P. (S-3118), 9210 ± 110 B.P. (S-3308), 8930 ± B.P. (S-3114), 8920 ± 130 B.P. (S-3309) and, 8160 ± 200 B.P. (S-3208) (Linnamae and Johnson 1999). All the radiocarbon dates were taken on bison bone (Corbeil 1995). Corbeil (1995:22) rejects the oldest and youngest dates as being outside the Cody Complex date range. On its own this would not be reasonable, but the other three dates cluster around 9000 years ago which suggests that the site and the Cody Complex material may very well be this age.

The other Cody Complex site in Saskatchewan that has been dated is the Niska Site. Three dates, 7,000 ± 185 B.P. (S-2353), 7,165 ± 320 B.P. (S-2453) and 5,910 ± 270 B.P. (S-2253), were obtained from the site all of which were considered somewhat suspect (Meyer 1985). All these dates are considered outside the norm for Cody Complex. However, it has been suggested that rejecting outright or "digging" for reasons to reject the 7,000 year old dates was premature (Pettipas 1986). Several reasons have been suggested as to why these dates may have been valid; including the possibility that the production of Cody Complex material continued in Saskatchewan longer than on other parts of the Plains (Peetipas 1986:168). However, later radiocarbon assays from the Niska site provided a new date of 8,475 ± 605 B.P. (S-2510) which places the site much closer to the traditionally accepted Cody Complex dates (Meyer and Liboiron 1990).

The dates for the Cody Complex suggest a long lasting technological tradition. The Complex begins around 10,000 years ago with the Alberta type and perhaps shortly after is followed by the Alberta/Cody types. The Alberta type appears to last until 9500 years ago, with no assignable end date to the Alberta/Cody types. However, around 9000 would not be unreasonable based on the mixing from the Horner Site. It is around 9500 years ago that the other types of the Cody Complex start appearing on the Great Plains. In the Southern Plains the Complex dates seem to often range from around 9500 to 8500 years ago, although several sites have produced dates around 8000 years ago. These ones are often discounted due to being outside what is considered the norm for Cody Complex dates.

In the Northern Plains sites often date within the 9500 to 8500 time period. However, younger dates have been associated with the Complex. These dates would suggest that the Complex was on the Northern Plains from 9500 until possibly 8000 years ago. As a whole, the Cody Complex can reliably be considered to be on the Northern Plains from 10,000 to 8500 years ago.

Chapter 4 Cody Complex in Saskatchewan

4.1 Introduction

The amount of Cody Complex material in Saskatchewan is relatively substantial when compared to earlier Paleo-Indian material. There are several sites in the province that have produced a significant amount of Cody material, some which have produced intact, excavatable components. There are also numerous small sites that have produced one or more surface recovered Cody Complex diagnostic artefacts.

In conjunction with these sites, individual Cody Complex projectile points and Cody knives have been recovered as surface finds throughout the province, thanks to the effort of avocational archaeologists. This chapter will be an overview of the Cody Complex material from Saskatchewan (Figure 4.1). It should be noted that overviews of the Cody Complex sites and finds have recently been done in Alberta (Dawe 2013) and Manitoba (Pettipas 2011). Initially the individual sites will be discussed followed by collections and/or material from surveys of areas and finally isolated finds that were not aggregated into these area surveys. Many of these assemblages have been viewed first hand, but the inability to do so did not preclude material from being included in this discussion.

4.2 Cody Complex Sites with Intact Components

4.2.1 Niska Site (DkNu-3)

The Niska Site is located in southwestern Saskatchewan (Figure 4.2). A local avocational archaeologist, Henri Liboiron, located the site and began collecting artefacts that

were being exposed by wind deflation. In the 1980s a rerouting of a nearby highway was planned which would impact the site and so an excavation was undertaken (Figures 4.2, 4.3, 4.4, 4.5). The information pertaining to the Paleo-Indian component of the excavation and the surface finds were described by Meyer (1985). A report on the entire survey of Highway #13 has also been published (Hanna et. al. 1983). When the author went to view the Paleo-Indian material collected from the site 2012 it was apparent that Mr. Liboiron had managed to collect more Cody Complex material since the original report was published in 1983 (Figure 4.6).

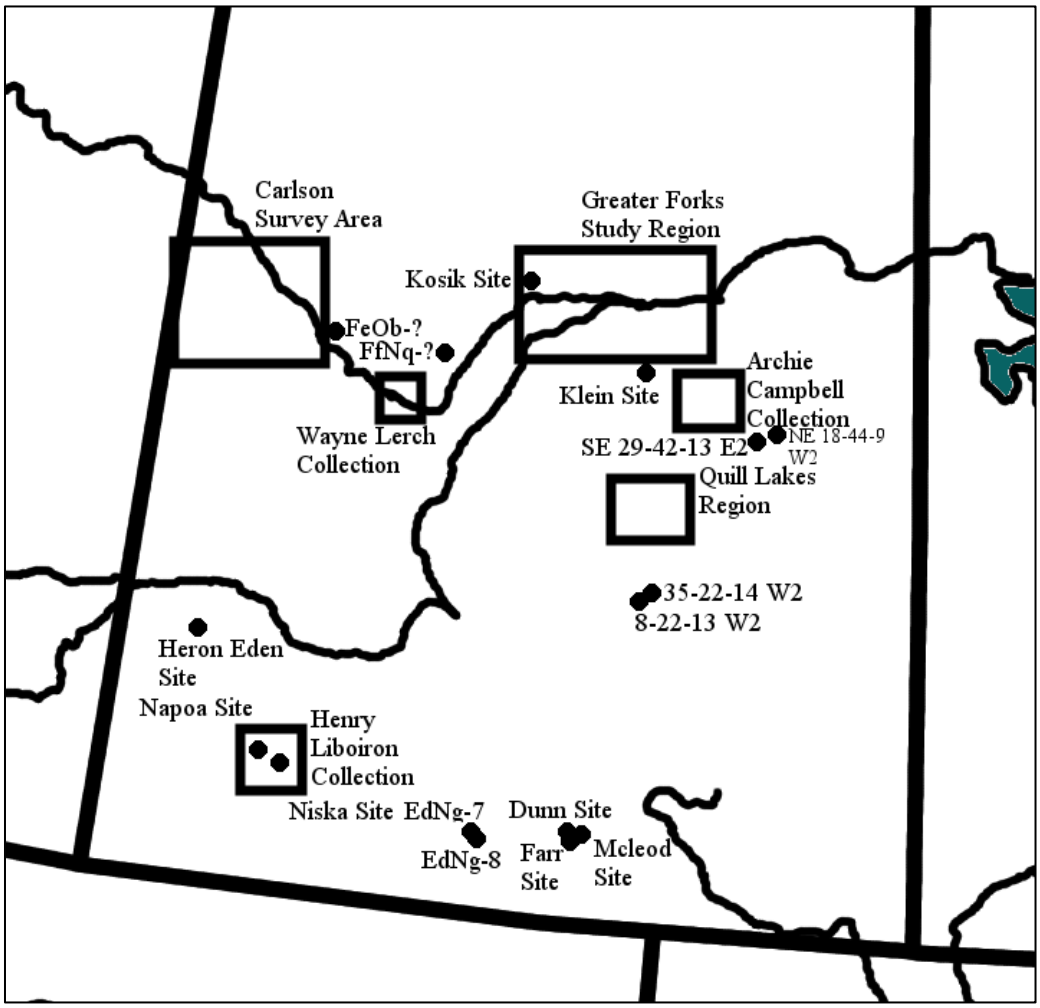

Figure 4.1: Areas and sites of Cody Complex finds. The dots indicate single sites and the rectangles represent areas of multiple sites often reported in singular reports.

Figure 4.2. Picture of the Niska site before excavation. Courtesy Dr. David Meyer.

Figure 4.3. Excavations at the Niska site. Both excavation blocks can be seen. Courtesy Dr. David Meyer.

Figure 4.4. Wall profile of an excavation block in the Niska site. Courtesy Dr. David Meyer.

Figure 4.5. *In situ* endscraper from the Niska site. Courtesy Dr. David Meyer.

Figure 4.6. Some of the Scottsbluff Cody Complex projectile points recovered from the Niska site. A, B, C, E, G are made of fused shale, D is made of agate, and H, F are made of Knife River flint. C and E were reported on in the original report (Meyer 1985) but the rest were recovered afterward.

Eleven diagnostic tools where originally reported from the site including stem fragments (Meyer 1985). The more current review of the material produced thirty-three different diagnostics items including complete points/knives, stems and blade fragments. The majority

(thirteen) of the projectile points were identified as being Scottsbluff in type. Two other projectile points were also identified at the site, one being recognized as an Alberta type and the second the Eden type. Nine Cody Knives were identified with the remaining nine diagnostics consisting of stem fragments.

The majority of the lithic material used to produce these tools is of two types, fused shale, sometimes called porcellanite (Johnson 1998:38), and Knife River flint. These material types, and the others that will be mentioned, are discussed in more detail in chapter five. About half of the artefacts are identified as being made from fused shale with most of the remaining tools and knives being made from Knife River flint. Only four items are not recognized as being made from fused shale or Knife River flint; they are identified as being agate, jasper, a type of chalcedony and a silicified material, possibly peat. Much of the Paleo-Indian material from the site was recovered from the surface including all the intact projectile points. However, Cody Knives and point stems were excavated from the site and radiocarbon dates were obtained on material from the site dating the layer that the knives were recovered from. One date, 5,910 ± 270 B.P. (S-2235) is much too recent and was suggested as possibly being contaminated by recent rootlets (Meyer 1985:28).

Two other dates, 7,000 ± 185 B.P. (S-2353) and 7,165 ± 320 B.P. (S-2453) (Meyer 1985:28), are also fairly recent when compared to many other Cody Complex sites. The first of these (S-2353) was an assay of a sample of soil from the occupation, which "can be considered only a general indicator of age" (Meyer 1986:172). The other date was obtained on bone which, as Meyer (1985:29) notes, can produce dates that are too recent; however, a problem with this sample was that the collagen yield was very small (Meyer 1986:172). Subsequently, a sample of charcoal was submitted and a date of 8,475 ± 650 B.P. (S-2510) was obtained, which is considered a more acceptable representation of the age of the site (Meyer and Liboiron 1990:229).

4.2.2 Heron-Eden Site (EeOi-11)

The Heron-Eden site is a bison kill/butchery site in the Great Sand Hills of Southwest Saskatchewan. No natural features are evident that would contribute to bison hunting, but it has been interpreted as being a primary kill site used during the winter (Corbeil 1995:130). This site was originally identified by avocational archaeologists who discovered bone on the surface as

well as several Cody Complex points. Excavations were undertaken and intact material below the surface was recovered including bone, lithics, and Cody Complex points (Figure 4.7, 4.8, 4.9). Five radiocarbon dates on bone where obtained: 10,210 ± 100 B.P. (S-3118), 9210 ± 110 B.P. (S-3308), 8930 ± 120 B.P. (S-3114), 8920 ± 130 B.P. (S-3309) and 8160 ± 200 (S-3208) B.P. The average of these dates is around 9000 years ago which falls in the middle of the accepted time range for the Cody Complex.

Thirty-four tools were recovered from the site, including thirteen projectile points, eight of which are mostly complete (Figure 4.10) (Linnamae and Johnson 1999:19). Seven of the complete points are identified as Scottsbluff and the other as the Eden type. The materials used to produce the projectile points are mostly exotic, including: Knife River flint, Beaver River sandstone, and agate (possibly from Montana). Many of the other tools are also made from exotic materials. A burin was made from a "yellowish jasper" (Linnamae and Johnson 1999:25), the end scrapers from various chalcedonies, jaspers and Knife River flint.

Figure 4.7. Excavations at the Heron Eden site. Courtesy Dr. Urve Linnamae.

Figure 4.8. Close up of an excavation block at the Heron Eden site. Courtesy Dr. Urve Linnamae.

Figure 4.9. Close up of the bonebed from the Heron Eden site. Courtesy Dr. Urve Linnamae.

Figure 4.10. Scottsbluff projectile points from the Heron Eden site, in the possession of the University of Saskatchewan. A) Scottsbluff type made of silicified wood, B) Scottsbluff type made of agate, C) Scottsbluff type made of Knife River flint, D) Scottsbluff type made of agate, E) stem made of chert, F) Scottsbluff type made of Knife River flint, G) Scottsbluff type made of Beaver River Sandstone, H) blade fragment made of Knife River flint, I) Scottsbluff type made of Knife River flint, J) pointed stem made of jasper, K) tip fragment made of jasper.

However, much of the debitage is composed of more local cherts (e.g. Swan River chert), chalcedonies, and various silicified materials (Linnamae and Johnson 1999:27). Overall, the variation in lithic material in the site assemblage is extensive and covers a great geographic area extending from northern Alberta and possibly as far south as Colorado, the latter based on the presence of a turquoise pebble (Linnamae and Johnson 1999:30).

4.2.3 Napao Site (DkNv-2)

The Napao Site is a multi-component site in southwestern Saskatchewan near the town of Ponteix (Figure 4.11). The site was found by avocational archaeologist Henri Liboiron. Excavations were undertaken by the Royal Saskatchewan Museum in the early 1980s but no publication was completed. The material collected by Mr. Liboiron and curated at the Notukeu Heritage Museum in Ponteix was examined as part of this study (Figure 4.12). Mr. Liboiron also kept a catalogue of all the material he recovered from the site.

In total, eighty-three tools were recovered from the site. A large portion of these are projectile points or fragments of projectile points. Scrapers, choppers, cores and drills have all been identified in the catalogue compiled by Mr. Liboiron. Along with the tools, debitage including flakes and shatter were also recovered. The recovered bone was mostly fragmentary and included both burned and unburned specimens.

Figure 4.11. Excavations at the Napao site. Courtesy Dr. David Meyer.

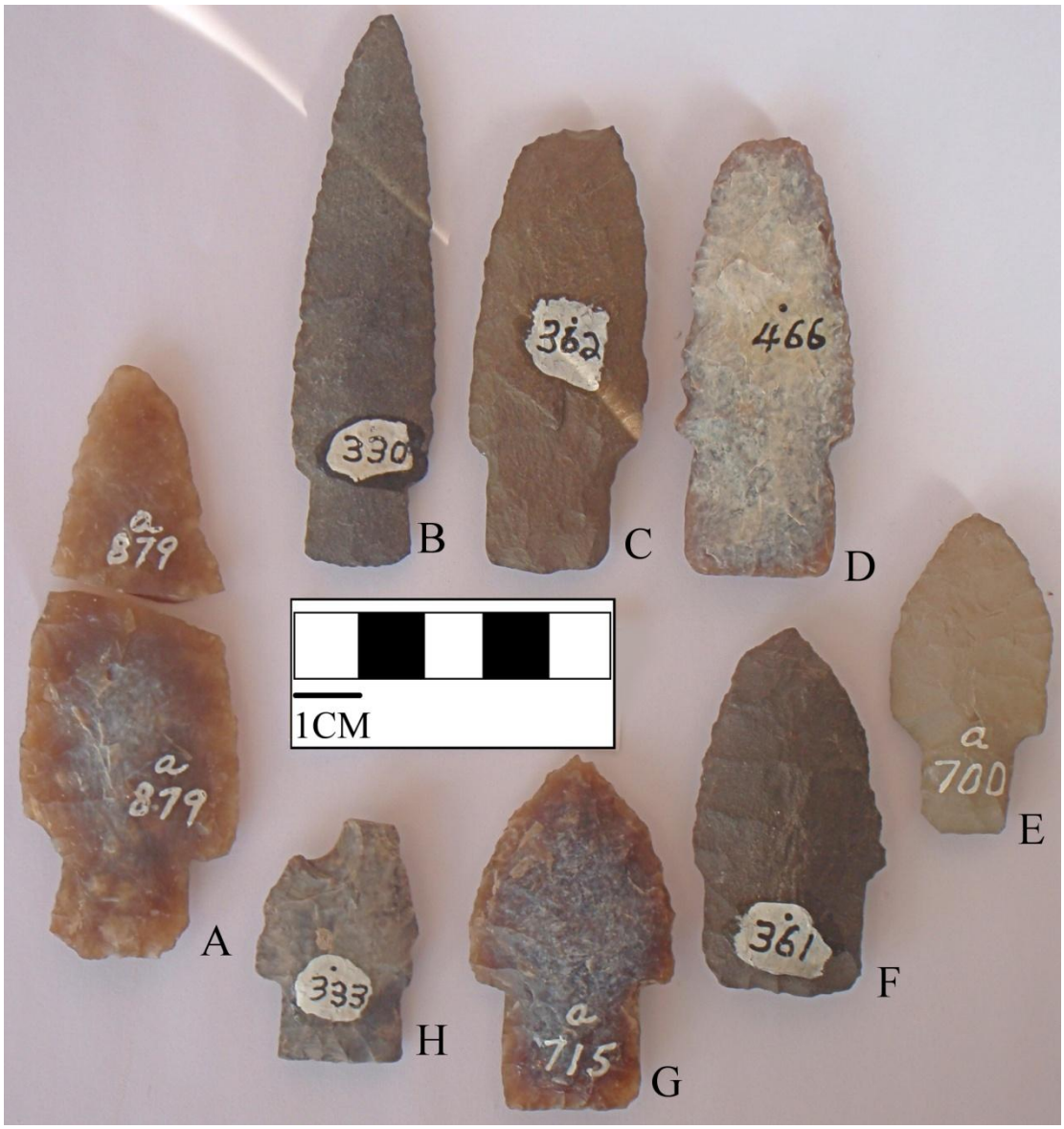

Figure 4.12. Cody complex projectile points recovered from the Napao Site. A) Alberta type made of Knife River flint, B) Scottsbluff type made of fused shale, C) Alberta type made of fused shale, D) Scottsbluff type made of Knife River flint, E) Alberta type made of fused shale, F) Alberta type made of fused shale, G) Scottsbluff type made of Knife River flint, H) Scottsbluff type made of chert.

The majority of the projectile points recovered from the site are identified as belonging to the Cody Complex or are squared stem fragments. However, other point types were recovered from the site including one Hell Gap point, an Oxbow point, several side-notched points and a few stems which may be Agate Basin or Hell Gap in origin. The site also produced one very large Cody Knife, and several projectile points show reworking patterns that suggest they were probably being used as knives as well.

The extent of the Cody Complex material at the site is unclear. The author recognized twenty-one diagnostics from the Cody Complex in the material at the Notukeu Heritage Museum. Four Alberta points, eight Scottsbluff, one Cody Knife, one probable Eden and seven fragments were recognizable as Cody Complex material. This was not all the material listed in catalogue, but unfortunately the remaining material was unavailable for the study. They were not at the Natukeu Museum and their location is unknown. All the complete points were accounted for but many stems and point fragments were part of the missing artefacts so more Cody Complex items may have been found at the site than recorded by the author.

Due to component mixing, only the identified Cody Complex lithic material will be considered. The two most common lithic materials are Knife River flint and fused shale of various colours. Only three diagnostics were not made from these two materials; one point made of chert, one blade fragment made of obsidian, and a point made of feldspathic siltstone. Several other tools and flakes, including some of the point fragments mentioned above, were not at the museum but were identified by Henry Liboiron as being made from feldspathic siltstone. This is not surprising as the Feldspathic siltstone is present in deposits from the Ponteix area (Johnson 1998:40).

4.3 Large Cody Complex Surface Sites

4.3.1 Dunn Site (DjNf-1)

The Dunn Site is a Cody Complex site located in a cultivated field near the town of Ogema, southeastern Saskatchewan (Figure 4.13). Biron Ebell (Ebell 1988) collected artefacts after being shown the site by the land owner, since then he has continued his collecting of material from the site. When the author viewed the assemblage in the care of Mr. Ebell, ninety-one projectile points had been recovered from the site whereas only seventy-seven had been recovered up to 1988. Flakes and other lithic material have been recovered from the site, but the majority of materials are projectile points. The Saskatchewan Museum of Natural History (Royal Saskatchewan Museum) conducted an excavation in 1970 and in situ flakes were recovered, but no projectile points or other tools (Ebell 2012: Personal Communication).

The site is located in a featureless field within the Ogema Basin in south-central Saskatchewan and is in one of the lowest spots in the valley. Several other Paleo-Indian sites are located around the valley, but they are found at higher elevations. One possibility for the

presence of the Dunn Site at this particular location is that even during a dry year water can be found nearby (Ebell 2012: Personal Communication).

Figure 4.13. Picture showing location of the Dunn site.

Most of the projectile points from the Dunn site were identified by Ebell (1988) as being of the Firstview type. As this type has never been recognized outside the Southern Plains and the author feels they are better described as Scottsbluff projectile points based on appearance and knapping characteristics. Many of the projectile points from the site are damaged due to cultivation (Figure 4.14). Several points have been reconstructed from fragments. Sometimes decades passed between finding these pieces. The dominant lithic material used at the Dunn site

is Knife River flint, including nearly all the projectile points and flakes recovered from the site. Only five of the projectile points from the site are not Knife River flint; one quartzite, two jasper, one chert and one fused shale.

Figure 4.14. Several of the more complete projectile points recovered from the Dunn site. They are all Scottsbluff projectile points made of Knife River flint.

4.3.2 Farr Site (DjNf-8)

The Farr Site is a multi-component site from the Ogema region in south-central Saskatchewan (Figure 4.15). It is located about eight kilometers from the Dunn site, but is located on the top of a kame, giving it a wide view of the Ogema Valley. This site has been

collected over several decades by Biron Ebell. Several different point types have been recovered from the site, from Paleo-Indian through to the Late Period.

Although no excavation has been undertaken at the site, there may still be intact subsurface deposits. Only half of the hill top is in a currently cultivated field. The other half is in a field that has been broken but was reseeded in the first half of the twentieth century and so may have suffered fewer disturbances.

Figure 4.15. North facing picture of the Farr site. The site is located at the top of the hill, near the car. The material has all been collected from the road and east of it.

The amount of Cody Complex material recovered from the site is fairly substantial (Figure 4.16). Forty-nine diagnostics items recovered from the site have been attributed to the Cody Complex. Many of these artefacts are fragments making identification of which particular Cody Complex point type difficult. However, several can be identified as Scottsbluff or Eden while several others may be Cody Knives.

Figure 4.16. Several Cody Complex diagnostic items recovered from the Farr Site. A) Scottsbluff type made of chert, B) blade made of Knife River flint, C) Cody knife made of white chert, D) Eden type made of garnet chert, E) Eden type made of orange chert, F) Eden type made of fused shale, G) Eden made of red jasper, H) Eden made of grey quartzite, I) fragment made of Knife River flint

The lithic material used at the Farr Site is highly varied. No one material type dominates the assemblage. Most of the material consists of various types of cherts and chalcedonies although Knife River flint is not uncommon with twelve of the forty-nine items being composed of this material. Fused shale, quartzite, jasper, agate and petrified wood have also been identified among the Cody Complex material.

4.3.3. Mcleod Site (DiNb-6)

The Mcleod site is multi-component site located in a cultivated field near the town of Radville in southeastern Saskatchewan. The site has been collected from for decades by more than one collector. Most of the material has been collected by the Mcleod family, but other

individuals have removed artefacts from the site (Joyes 1997:4). The author was not able to gain access to the collection for viewing and so all the information from the collection is from the Joyes (1997) report.

Cody Complex material makes up the bulk of the material from the site, but point types from a large temporal range have been found from Paleo-Indian times (e.g. Agate Basin) to more recent times (e.g. side-notched points) (Joyes 1997:32). Due to the mixed nature of the site it is hard to attribute artefacts recovered other than projectile points to the Cody Complex. However, some of the endscrapers are spurred which suggests that at least some of them may be related to the Paleo-Indian occupations at the site. Two drills may also be associated with the Cody Complex, based on their flaking and the association of drills with the Cody Complex. Site function is hard to determine, but Joyes (1997:36) suggests that the site may have been a bison kill site.

Seventy-six projectile points were identified as belonging to the Cody Complex, thirty as Scottsbluff, ten Eden and the rest not attributable to a type due to their fragmentary nature. Five Cody knives were also identified in the collection from the Mcleod site.

Three of the Cody knives were identified as being made from Knife River flint, a fourth made from brown jasper and a fifth from grey chalcedony. Most (sixty) of the projectile points (Joyes 1997:Table 1) are made from Knife River flint. Fused Shale (Porcellanite) makes up the next most common lithic material with seven projectile points being made from it. Five points are made from Swan River chert, two from jasper and one each of an unidentified chalcedony and shale.

4.4 Large Collections and Surveys with Cody Complex Material

4.4.1 Wayne Lerch Collection

The Wayne Lerch collection consists of material collected from a number of sites identified by Mr. Lerch near the town of Radisson in south-central Saskatchewan. Over the years he has collected a large amount of material, including hundreds of projectile points some of which this author identified as Cody Complex (Figure 4.17).

Seventeen Cody Complex diagnostics were recorded in the collection. These diagnostic items were from thirteen different sites. Ten of the points are identified as Scottsbluff, two as Alberta, two as Eden, and one as a Cody knife. The last two artefacts recorded are drills with

square stemmed bases. These drills are very similar to the one found at the Niska site and appear to have been reworked from projectile points.

The lithic material used for these Cody Complex artefacts is highly varied. Five of the points are made out of Beaver River sandstone. This material is very similar to lithic material identified as Beaver River sandstone at the Heron Eden Site. The most common materials from these sites are various types of cherts including Swan River chert. Other materials identified include basalt, chalcedony, quartzite and obsidian. As the collection is made up of points from a large number of sites, the wide variation in material is not unexpected.

Figure 4.17. Some of Cody Complex projectile points recovered from around Radisson. A) Alberta type made of Beaver River sandstone, B) Scottsbluff type made of Beaver River sandstone, C) Scottsbluff type made of Beaver River sandstone, D) Alberta type made of Beaver River Sandstone, E) Scottsbluff type made of Knife River flint

4.4.2 Greater Forks Study Region

The Greater Forks Study Region (see figure 4.1) is an area of Saskatchewan that underwent a significant archaeological study through an interdisciplinary project called the Study of Cultural Adaptations in the Prairie Ecozone or SCAPE. The project was not just limited to

this time period of Saskatchewan but considerable work was done on the Paleo-Indian occupation in the Greater Forks Study Region (Meyer et. al. 2011).

The study region includes an area west of the convergence of the North and South Saskatchewan Rivers east to about the town of Nipawin in east central Saskatchewan. Despite being a fairly large area there has been relatively little Paleo-Indian material recovered; when compared to areas in more southern portions of Saskatchewan. This may be due to the time when the ice and glacial lakes were still in the area preventing full habitation or due to minimal survey. Whatever the reason, this has lead to a situation where Paleo-Indian material is often found in singular isolated finds. For a breakdown of what is found at each site and their specific location see Meyer at. al. (2011). It should be noted that information on several of the points from this region was originally published in other articles such as the Fennell site report (Felton 1971).

In total, forty-three Cody Complex diagnostics have been reported from the area. Of these points eleven were identified as the Alberta type. Along with these Alberta projectile points there have also been eleven Scottsbluff points, two Eden points, four Cody knives and fifteen stems and other fragments recorded from this area attributed to the Complex.

The different lithic material used in the area is not varied. Nine of the Alberta points were identified as being made from Knife River flint with the other two being made from Swan River chert. One Scottsbluff point was made from fused shale, two from Knife River flint and the remaining from Swan River chert. The two Eden points are made of Knife River flint. The Cody knives are split with two made from Knife River flint and the other two from Swan River chert. Most of the fragments and stems are made from Swan River chert totalling eleven leaving the remaining four to be made from Knife River flint. Overall the majority of the Cody Complex artefacts found in this area are made from Swan River chert.

4.4.3 Quill Lakes Region

Fifteen avocational collections were examined from the Quill Lakes area (Novecosky 2002a). The collections together had tens of thousands of artefacts and contained close to 1300 diagnostic artefacts. Thirty-eight of these diagnostics were identified as belonging to the Cody Complex. Most (thirty-one) of the Cody Complex material was recovered from the Haskey Area (Novecosky 2002b). The rest of the diagnostics were mostly found individually from throughout the Quill Lakes Region (Figure 4.1).

Eighteen of the diagnostic items were made from Swan River chert. The next largest group was various other cherts combining for a total of eleven artefacts. Seven tools were made from Knife River flint and the remaining two were made from a material that was unidentified. Much like the Greater Forks Region to the north of this area, the material use appears to be focused more on local lithic material from Saskatchewan.

4.4.4 Carlson Survey of Collections in West-Central Region

The West-Central Region encompasses an area extending from the city of North Battleford west and north to the city of Lloydminster (Figure 4.1: Carlson Survey Area). A survey of the Paleo-Indian material in the area was undertaken about two decades ago (Carlson 1993). The survey looked at the collections of a number of avocational archaeologists. Many of these collections had been built up over a number of decades and included a significant amount of material.

In total ninety-eight Cody Complex diagnostic artefacts were reported from this area. Measurements taken were limited to length, width and thickness so only site, type and material type are recorded for this thesis (Appendix A: Page 150). Some changes in identification of projectile point types and material were made, chiefly the use of Beaver River sandstone. However, the only available knowledge concerning the appearance of these points is from drawings.

A large number of different materials were recorded during the survey. The most common lithic material was Swan River chert 36.7% (thirty-four). The next most common material was Knife River flint at 17.3% (seventeen). The only other material found with a percentage over ten was various types of quartzite with a total of 11.2% (eleven). The rest of the materials include fused shale (four), agate (one), silicified siltstone (six), various chalcedonies (three), cherts (eight), silificifed peat (four), jasper (six) and quartz (one). The final and possibly most interesting material described was an "unusual sandstone material often found with Paleo-indian points" (Carlson 1993:4). Based on the description of the material and the location of the finds this material may be Beaver River sandstone. With the possibility of Beaver River sandstone being found near Radisson and the relative proximity of the main quarry areas, it would not be improbable for this material to be found in west-central Saskatchewan. In total three points from the collections in this area were considered to be made of Beaver River sandstone.

4.4.5 Archie Campbell Collection

The Archie Campbell collection (Ramsey 1998) is a significant collection by the avocational archaeologist, Archie Campbell. The collection is focused around the village of Bjorkdale in east-central Saskatchewan (Figure 4.1). The collection includes material from the Paleo-Indian period to the Historical period. Even with the substantial size of the collection, the amount of Cody Complex material is minimal. However, the Snider site (Campbell and Meyer 1971) is a site from this collection that has been previously reported on. The Snider site produced three Scottsbluff points. Two points were made from a gray chert and the third was made from a quartzite. Along with these points a stemmed endscraper made from brown chalcedony (Knife River flint) was also recovered. Other than this singular site the amount of Cody Complex diagnostic material recovered from the other locations was limited to one or two at most.

For much of the reported material in the collection no pictures were included. If a point was only identified as "stemmed" it was not included in this study. This decision was made because the term stemmed can be used to describe Hell Gap and Agate Basin points and not just Cody Complex points. There were also limited measurements taken of the Cody Complex material. Fortunately, the lithic material type is listed in the catalogue for all the Cody Complex diagnostics.

In total, fourteen diagnostics of the Cody Complex can be identified with certainty. Twelve of them are identified as Scottsbluff points, one an Eden point and one as a Cody knife. One Scottsbluff point is made from Knife River flint and three made from different types of chert. The rest of the diagnostics are made from Swan River chert.

4.4.6 Henry Liboiron Collection

The Henry Liboiron collection derives from different localities around the town of Ponteix in southwestern Saskatchewan (Figure 4.1). Some significant sites were located by Mr. Liboiron including the Niska and Napao sites. Most of the material from those sites, along with all the other material collected by Mr. Liboiron can be found, on display, at the Notekeu Heritage Museam in the town of Ponteix. As the Niska and Napao site assemblages have already been discussed, the other material found by Mr. Liboiron will be discussed in this section.

Cody Complex material was surface collected from eighteen other sites in the Ponteix area. Most of the Cody Complex finds from these sites were limited to one or two diagnostics.

Three sites, however, produced a little more material then the other sites. The Bambino Site (DkNu-37) produced nine Cody Complex diagnostic artefacts (Figure 4.18). Four Alberta type, one Scottsbluff type, one Cody knife, and three mostly blade portions of points that look similar to the Alberta points recovered from the site. The Cody knife, one of the Alberta points and two of the blade portions are made from Knife River flint. The rest of the material is made from fused shale.

DkNu-15 yielded six Cody Complex diagnostic items (Figure 4.19). Three Scottsbluff points were recovered from the site and made from Knife River flint. Two Alberta points made from fused shale where also recovered. Lastly one Cody Knife made from Knife River flint was recovered. The final site with a relatively greater amount of material has no known corresponding Borden number or vernacular name and so is referred to by the legal land location NW 23-8-12-W3.

This site had seven diagnostic items that could be attributed to the Cody Complex (Figure 4.20). Two Scottsbluff points, four Eden points and a stem which cannot be distinguished as a particular type. The stem is made from fused shale, as are the two Scottsbluff points. The Eden points are a mixture of different material types; one is made from Knife River flint, one from another unknown chalcedony, the third made from jasper, and the fourth made from an unknown material. The reason the material is unknown is because the final Eden points is a cast of the original point; the location of the original point is unknown. Where the point this caste was made from is unknown.

The remaining fifteen sites produced twenty-two artefacts related to the Cody Complex: seven Scottsbluff points, six Alberta points, five Cody knives, two Eden points and three stem fragments. Half of these artefacts were made from fused shale, nine from Knife River flint and one each of a chert and silicified wood. Finally in the collection of Mr. Liboiron there was a group of projectile points with no precise provenance. This group of points was simply labeled as being from around the Ponteix area. This group of points contained projectile point types from throughout the entire Paleo-Indian period including the Cody Complex. Most of the Cody Complex materials are just stems, totalling nineteen. Nine Cody knives are found in this group. Finally six projectile points were identified; two of them Alberta points and four Scottsbluff. Twenty-four of the thirty-three Cody Complex diagnostics were made of Knife River flint. The rest are single finds of other materials such as fused shale, jasper and various cherts.

Figure 4.18. Mostly complete Cody Complex items from the Bambino site. A) Alberta type made of fused shale, B) Alberta type made of fused shale, C) Scottsbluff type made of fused shale, D) Alberta type made of fused shale, E) Alberta type made of Knife River flint, F) Cody knife made of fused shale

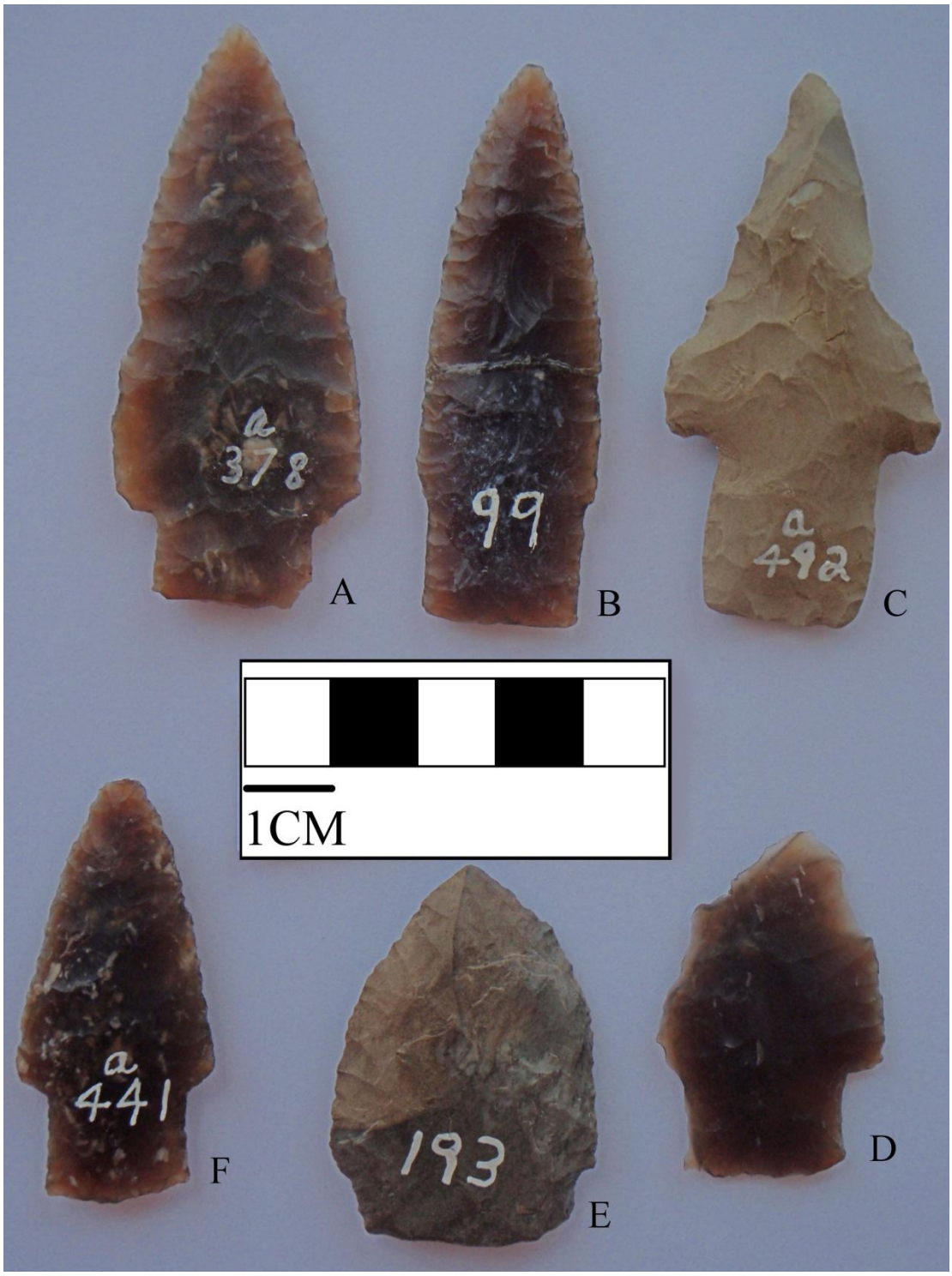

Figure 4.19 A, B, F, are Scottsbluff type points made of Knife River flints, C, E are Alberta points made of fused shale and D is a Cody knife made of Knife River flint

Figure 4.20. Cody Complex material recovered from NW 23-8-12-W3. A) Eden type made of agate, B) Scottsbluff type made of Fused shale, C) Scottsbluff type made of fused shale, D) Eden type made of chalcedony, E) caste of a Eden type, F) stem made of fused shale, G) Eden type made of Knife River flint

4.5 Miscellaneous Finds, Collections and Small Sites

4.5.1 The Kosik Site (FhNi-89)

The site is located along the Garden River east of Prince Albert, in central Saskatchewan (Frey 1994). The site was located by Doug Frey, and two Cody Complex artefacts were identified at the site; their type and the material used is not identified, not much more can be said

on the material found at the site but it does provide information that Cody Complex material can be found in locations north of the North Saskatchewan River in central Saskatchewan.

4.5.2 The Klein Site (24-46-19 W2)

The Klein Site is a surface collection site from the Melfort Area in east-central Saskatchewan (Nero 1957). Based on photographs of the collection, there appears to be three Scottsbluff points recovered from the sites. Two show evidence of heavy reworking with a third that is broken part way up the blade. The site also shows evidence of other Paleo-Indian projectile points as well as points from time periods into the historical period. The materials of the projectile points are various types of cherts with only three other tools being made from a non chert material.

4.5.3 EdNg-7

This site is located in south central Saskatchewan near the city of Moose Jaw, south-central Saskatchewan (Ebell 1971). One Scottsbluff point was recovered from this location. No other points have been reported from this location. The point is broken with most of the blade missing. The point is made from fused shale with inclusions of quartz.

4.5.4 EdNg-8

EdNg-8 is another site from south-central Saskatchewan near the city of Moose Jaw (Ebell 1971). Two Alberta points were recovered from the site. The first one is "complete" in profile but is split laterally. The cause from this is suspected to be extreme heating of the point. This point is made from Knife River flint. The second point is made of a similar material but it contains veins of a white inclusion. This latter is just a blade portion but the break shows little weathering suggesting that it was recent.

4.5.5 FeOb-?

This site is located near the city of North Battleford. No borden number was assigned to it in the publication. A small Scottsbluff point was recovered from this site (Felton 1971). The point is made from Knife River flint and is complete. The drawing suggests that some reworking of the blade has been done.

4.5.6 FfNq-? NW 7-45-5 W3

This site is located on farm land near the town of Blaine Lake in south-central Saskatchewan. No borden number was assigned to the site in the publication (Felton 1971). One Scottsbluff point was recovered from the site. The point is made from a greyish white mottle chert possibly Swan River chert. The tip has been broken.

4.5.7 SE 29-42-13 W2

A Scottsbluff point was found at this land location and is in the possession of a Mr. A.W. Playford. Unfortunately, lithic material is unknown and an outline drawing is the only information on the appearance of the point.

4.5.8 NE 18-44-9 W2

A Scottsbluff point was found at this land location and is in the possession of a Mr. G Listzenburger. This point is made from Knife River flint. The only other information about the point is an outline drawing.

4.5.9 35-22-14 W2

A Scottsbluff point was recovered in east-central Saskatchewan from this land location in 1942 (Tomenchuck and Seib 1973). No other Cody Complex material was reported as being found at the site. There is also no mention of what other material was being recovered from the site. However, the author mentions that repeated visits over the years by avocational archaeologist were being conducted (Tomenchuck and Seib 1973). The point is made from Knife River flint and numerous measurements were taken.

4.5.10 8-22-13 W2

In 1960, a Scottsbluff point was recovered from this land location in east central Saskatchewan (Tomenchuck and Seib 1973). Like the similar nearby site 35-22-14 W2 repeated visits have produced no other Cody Complex material. Measurements were taken of this point which is made from a grey chert.

Chapter 5 Lithic Materials in Cody Complex sites in Saskatchewan

5.1 Introduction

A diverse array of different material types was used to create different Cody Complex tools in Saskatchewan. Although many often have sources in Saskatchewan they are usually only found in limited secondary contexts such as gravel beds. Whereas, other materials have known source locations only found outside of Saskatchewan. The following is a breakdown of the known material types and where their source locations can be found. Where possible it is also determined at what locations a material would be considered local or exotic in Saskatchewan. Also discussed are some lithic materials whose source determinations are difficult or impossible to make. In the case of these materials, they are put into the exotic category as it is most likely that they are not found near the site where they are recovered.

5.2 Lithic Materials found in Saskatchewan

5.2.1 Swan River Chert

Swan River Chert is one of the most common lithic materials found in Saskatchewan. There is no bedrock source of Swan River chert in Saskatchewan. For a long time it was suggested that the bedrock source for Swan River chert was probably somewhere in west-central Manitoba (Campling 1980:292). Eventually a bedrock source was located in west-central Manitoba (Grasby et. al. 2002). However, direct procurement by precontact people was probably unlikely from this particular source (Grasby et. al. 2002:279).

Swan River chert would have been deposited throughout most of southern Saskatchewan (as well as Manitoba, Alberta, northern Montana and northeastern North Dakota) due to glacial

activity (Low 1996). Swan River chert is highly variable in colour; ranging from white to grey to bluish. If the material is heat treated it can also show various shades of orange, pink or red (Campling 1980:294; Low 1996:165). When heat treated the material also obtains a waxy luster. One of Swan River chert's most distinctive features is the presence of vugs (Low 1996:165). Vugs are typically lined with silica crystals and can have detrimental effects on flintknapping. Better, finer grained, examples of Swan River chert have few to no vugs which makes these variants of Swan River chert the best choice for the construction of projectile points.

Due to the large area in Saskatchewan where Swan River chert can be found, it is considered a local lithic material throughout the province. However, it has been suggested that Swan River chert found in the west portion of the province was transported there by people (Johnson 1998:31). While there is no doubt that Swan River chert would have been transported by people that does not make it an exotic material in any part of southern Saskatchewan (Low 1996:166 Figure 1). The presence of Swan River chert in any location throughout the southern half of the province is difficult to attribute to people instead of glaciation. Ergo for the purpose of this study, Swan River chert will be considered a local material.

5.2.2 Quartzite

In Saskatchewan there are two major types of quartzite. One is called Athabasca Quartzite (Johnson 1998:28) and the other is Rocky Mountain Quartzite (Johnson 1998:30). Athabasca Quartzite is found as cobbles throughout Saskatchewan. The material was spread from the Precambrian shield by glacial action into southern Saskatchewan. The cobbles can be of any size but are usually angular in shape. Tan and white are the most common colours, however, many colours are possible.

Rocky Mountain Quartzite cobbles are mostly found in southwestern Saskatchewan. The material was transported by fluvial action eastward into Saskatchewan. Cobbles can be found in any size and are rounded in shape with many impact scars. Tan and white are the most abundant colour types, but shades of blues, purples and pinks are also common.

These two quartzites are distinguishable to the naked eye only when found in cobble form or with cortex still available. Petrographic and chemical analysis can be used to differentiate the types, but such tests are destructive and not practical to use on projectile points. Outside the southwest portion of the province any quartzite material has better odds of being Athabasca Quartzite, but the material could also be from any other quartzite source and so such a distinction

was not made. Due to the difficulty of determining which type of quartzite a projectile point or tool is made from they are all subsumed within one category for this study.

Although quartzite Cody Complex projectile points are rare when compared to other materials, examples have been found in most parts of the province. These are considered to be made of local material because of the widespread presence of the different types of quartzite throughout the province.

5.2.3 Fused Shale

Fused shale is a fine grained material that is used to manufacture a variety of tools including projectile points. Fused shale is often referred to as porcellanite or called silicified siltstone (Johnson 1998:38). Whenever these terms were used in other publications or catalogues, they were subsumed under the term fused shale for this study.

Fused shale is extracted from coal beds which have combusted, transforming the surrounding rock into a knappable lithic material often of good quality. The colour variation is highly varied with black, grey, yellow and red all being common. Reported sources are found in south-central and southeast Saskatchewan. However, many other sources of the material are probably available from southern Saskatchewan wherever coal beds are found (Johnson 1998:39). Locations with coal beds near the surface in Saskatchewan include the areas around Shaunavon (in the southwest of the province), Estevan (in the southeast of the province) and Willow Bunch/Wood Mountain in the south-central part of the province (Mackenzie 2003:10).

For most sites fused shale sources are too far away to be considered local. However, at a more regional scale the material can be considered a local material. In the southern region of the province there are many direct sources of fused shale and so in these regions so therefore it could possibly be considered locale at dome sites.

5.2.4 Feldspathic Siltstone

Feldspathic siltstone is a type of silicified siltstone that is commonly confused with quartzite, often being referred to as quartzite or red quartzite in the literature (Johnson 1998:39). The material is usually maroon in colour, but unlike a quartzite that may be of the same colour, the individual grains cannot be distinguished with the naked eye. Due to these issues this material is often misidentified. If the material was not identified personally or there were not high quality photographs available, it may have been identified incorrectly in the literature and

corrections could not be made. As such, feldspathic siltstone is probably underreported in collections whether discussing Cody Complex material or other cultural complexes throughout the province. The material is also fairly difficult to work and therefore was often used to make tools other than projectile points, such as endscrapers. This means the focus on projectile points and diagnostic materials for this study could further increase the underrepresentation of the material in collections.

Feldspathic siltstone was transported into southwestern Saskatchewan by fluvial process. The material is found as fairly large size cobbles in gravel deposits. The material probably originated in Montana (Johnson 1998:40). The material is known from gravel deposits in the area around the town of Ponteix (Johnson 1998:40). Trace amounts of the material can also be found in the gravels from other areas of southwestern Saskatchewan. This material when identified in southwestern Saskatchewan can be considered a local material at some sites. Throughout the rest of Saskatchewan, feldspathic siltstone is an exotic material that would only be present as a result of human transport.

5.2.5 Silicified Peat

Silicified peat is a fine grained material that is often found as nodules in gravels throughout southern Saskatchewan (Johnson 1998:32). Silicified peat has many of the same properties as Knife River flint such as a brownish colour, fossil plant inclusions, and a creamy coloured patination. The major difference between the two lithic types is in the quality. Knife River flint knaps very well and often contains no internal structural flaws, whereas silicified peat often breaks along planes that makes flintknapping challenging. High quality silicified peat does occur and can be very similar to Knife River flint. Smaller tools are often easier to make but large, Paleo-Indian projectile, points do occur.

Well-known gravel deposits containing silicified peat can be found near Lake Diefenbaker (particularly the Outlook area), and in the uplands of the Wood Mountain region (Johnson 1998:34). However, it is suggested that silicified peat can probably be found throughout most of southern Saskatchewan from about Lake Diefenbaker south. This would classify silicified peat as a local material in southern Saskatchewan and an exotic material in more northern locations.

5.2.6 Other Materials

In Saskatchewan there are a number of silicified materials, other than silicified peat, used by the tool makers of Cody Complex. These materials included generalized material such as silicified wood and silicified siltstone (often found in pebble form). These materials often make a minor portion of the identified diagnostic items at a site or in a collection. Many of these materials are difficult to source as they are often generic looking and so chemical analysis would be the only possible way to differentiate them. However, even if such work was done the source location may not be known anyway. Several sources of silicified wood and silicified siltstone pebbles have been identified in Saskatchewan (Johnson 1998), but there are probably other unknown sources throughout the province.

Like these other silicified materials there are many different types of cherts and chalcedonies in the different various Cody Complex collections. These materials are often found in minor amounts. These materials are from unknown sources and the only way to distinguish many of them would be through chemical analysis as well as finding the source location. Although many of them may be found in Saskatchewan, these various silicified materials, cherts and chalcedonies will be considered exotic materials for this study.

5.3 Lithic Materials not found in Saskatchewan

5.3.1 Knife River Flint

Knife River flint is a brown, fine grained lithic that often makes a good flintknapping material. Knife River flint is a silicified lignite (Gregg 1987:368) which is why fossilized plant remains can sometimes be seen in the material. Although it is often called a chalcedony it "lacks the fibrous microstructure that characterizes chalcedonies" (Gregg 1987:367).

The bedrock source(s) of Knife River flint are suggested as being found within the Golden Valley Formation in western North Dakota (Clayton et. al. 1970:289 Figure 4; Gregg 1987:369). The material was obtained by precontact people from secondary sources such as the quarries recorded in Dunn and Mercer Counties of North Dakota (Clayton et. al. 1970:282). Pebbles and cobbles of Knife River flint can be found throughout eastern North Dakota, eastern South Dakota, western Minnesota and even into Iowa (Ahler 1977:138; Gregg 1987:369-370). Currently, there is no evidence that Knife River flint material can be found in Saskatchewan. Therefore, Knife River flint is an exotic material whenever it is found in Saskatchewan.

A distinctive trait of Knife River flint is the creamy patination that develops on the material. Patination has been used to try and relatively date tools made from Knife River flint (Ahler 1975:153). However, it has been shown that many factors affect the rate of patination and so it is not a good indicator the age of the material (VanNest 1985:336). An example of this issue is seen at the Walth Bay site in South Dakota. The "Archaic" period material had more patination then the Paleo-Indian material (Ahler et. al. 1974:907). Sometimes a Knife River flint tool will be completely patinated leading to an incorrect identification of material type at a quick glance. However, it has been observed that most tools end up with patination on only one side.

Heat treatment of Knife River flint to 225°-250°C can lead to improved flaking properties with some reduction in strength of the stone (Ahler 1983:5). At these temperatures the material cortex changes colour but fresh flake scars take on a waxy luster; new flakes after treating will show rippling of the flake scar surface (Ahler 1983:5). The colour of the material will darken after heat treatment and lose a percentage (40-50%) of translucency (Ahler 1983:5). Higher temperatures show too significant a decrease in stone strength to make it worth doing (Ahler 1983:5).

One note of import; in southeastern Alberta a very similar material called Hand Hills agate has been found. Much like Knife River flint this material is brown coloured and semi-translucent. It has also been suggested that a brown translucent material, much like Knife River flint can be found along the Souris River. Without chemical and/or petrographic analysis there would be no way to tell the difference between these brown translucent lithic materials. The other materials would also be exotic but it would suggest different movements into, or interactions with, different areas then if the material is Knife River flint. Due to this dearth of data on possible source locations of brown translucent material it was determined that, for this study, all brown translucent materials would be considered to be Knife River flint.

5.3.2 Beaver River Sandstone

The name Beaver River sandstone (even though it is not one) was first used in the early 1980s to describe the material (Fenton and Ives 1984). The name has persisted and been the most commonly used name in the literature (e.g. Saxberg and Robertson 2012; Tsang 1998); therefore it shall be the name used in this study. Other names used to describe the material include but is not limited to: Muskeg Valley Microquartzite (De Paoli 2007), Muskeg Valley Silicified Limestone (Young 2006) and Beaver River Silicified Sandstone (Saxberg and Reeves 2003)

Beaver River sandstone is an orthoquartzite that was formed by the dissolution of the parent material and then, after being subjected to high heat and pressure it recrystallized as the rock found in northeastern Alberta (Tsang 1998). It can be found in different colours from various shades of red due to ferric oxide (Abercombie and Fend 1997:260); or as different shades of grey, often with a mottled appearance due to the presence of bitumen throughout the rock (Tsang 1998:17). Beaver River sandstone can be found in different grades of workability from unusable macro-crystalline material to highly knappable cryptocrystalline material. Macro-crystalline material has been recorded in many different locations near Fort MacKay, Alberta (Tsang 1998). The only known bedrock source of cryptocrystalline material was been found in the Athabasca River Valley near Fort MacKay. This area has been called the Quarry of the Ancestors (Saxberg 2007:13). Many different sites have been recorded in this area (e.g. Saxberg and Reeves 2006). Beaver River sandstone can also be found in secondary contexts north of Fort MacKay, Alberta (Saxberg and Roberston 2012). Specular quartz grains (if present), usually less than 1 mm in diameter, can be used to distinguish Beaver River sandstone from similar materials (De Paoli 2007:1). Fossil inclusions are also evident in some specimens (Fenton and Ives 1984:173).

Beaver River sandstone is found at many sites from throughout northeastern Alberta and into northwestern Saskatchewan. In Saskatchewan the material has been identified from sites along the Clearwater River Valley (Korejbo 2011), near Buffalo Narrows (Millar 1997:121) and from south western Saskatchewan at the Heron Eden site (Linnamae and Johnson 1999). Although the geological formation that contains Beaver River sandstone is found in Saskatchewan (Patterson et. al. 1978:11) it has been suggested that there are no sources of Beaver River sandstone in Saskatchewan (Korejbo 2011:22). This means that Beaver River sandstone is an exotic material whenever it is found in Saskatchewan.

It should be noted that a similar material to Beaver River sandstone is Tongue River silicified sediment; which can be found in southeast Montana, southwest North Dakota and northwest South Dakota (Ahler 1977:135 Figure 1; Keyser and Fagan 1987). Tongue River silicified sediment grain size varies from extremely fine to coarse (Porter 1962:268). The colour can range from gray to having yellow or red hues (Porter 1962:268). The finer examples of the material tend to be gray with the yellow and red hued examples being coarser (Ahler 1977:135,

139). Secondary deposits of the coarser material can be found in northwestern Iowa (Anderson 1978).

The red hues may be due to heat treatment of yellow Tongue River silicified sediment (Ahler 1977:139). Heat treament has shown to be highly effective at making the courses Tongue River silicified sediment much more knappable (Anderson 1978:151). Root and stem holes are commonly seen in the large coarse Tongue River silicified sediment samples (Porter 1962:268) but few fossil plant inclusions are seen in the find-grained material (Ahler 1977:137).

5.3.3 Beaver River Sandstone or Tongue River Silicified Sediment

During the course of this study the author had several conversations where the issue of identifying material, recovered in southern Saskatchewan, as Beaver River sandstone was questioned. These conversations often mentioned how Tongue River silicified sediment is macroscopically similar to Beaver River sandstone and that it may actually be the material being utilized. However, microscopically they are very different; for an indepth discussion of this aspect of Beaver River sandstone see Tsang (1998) and for Tongue River silicified sediment see Porter (1962) and Ahler (1977).

Both fine grained Beaver River sandstone and fine grained Tongue River silicified sediment can be greyish in appearance and sometimes contain fossil inclusions. However, Beaver River sandstone sometimes has visual quartz grain inclusions (De Paoli 2007:1). Due to these visual similarities, and restrictions on this project preventing archeometric studies, a different means to determine which material was being utilised at Cody Complex sites in Saskatchewan will have to be used.

The main argument used to suggest that these artefacts where made from Tongue River silicified sediment is based on the quarry location for this material. Tongue River silicified sediment quarry area is found in the same direction from Saskatchewan as the Knife River flint quarry area. The suggestion is that since a large amount of one material, Knife River flint, was being moved from western North Dakota; a second material from a little farther away may also be brought into Saskatchewan from this direction.

However, none of the Cody Complex material in the eastern half of Saskatchewan has been identified as being made with Beaver River sandstone or Tongue River silicified sediment, by this author or any other. Material such as these has only been identified in western

Saskatchewan. In contrast Knife River flint is extremely common throughout the entirety of southern Saskatchewan.

It has also been noted that Tongue River silicified sediment was usually used as utilized flakes and crude bifaces instead of projectile points or scrapers (Anders 1978:156; Porter 1962:268). In contrast the author knows of no such suggestions of limitations on the use of Beaver River sandstone for particular types of tools. It has also been noted that the evidence for long distance trade or transport of the Tongue River silicified sediment is absent in the archaeological record (Keyser and Fagan 1987:234).

In summary Cody Complex artefacts identified as Beaver River sandstone have only been recognised in western half of Saskatchewan. In particularly most of these materials are seen in the west-central area. This area of Saskatchewan is hundreds of kilometres closer to the Beaver River sandstone quarry area then the Tongue River silicified sediment quarry area. Also these materials are all finely crafted projectile points and Cody knives, the types of tools rarely made on Tongue River silicified sediment. Due to these factors this author feels confident in identifying these grey and tan Cody Complex artefacts in Saskatchewan as Beaver River sandstone.

5.3.4 Minor Exotic Lithic Materials

There are many different materials that would fall under this category. Some of these would be jaspers, various agates such as Montana Agate, as well as cherts and chalcedonies if they are recognizable and have a known source location; it should be noted that most cherts and chalcedonies are considered local unless there is other information suggesting otherwise. These exotic materials are found in small quantities when present. Usually it is difficult to source these materials except for the designation of exotic. Therefore, they provide minimal information on the interactions that the makers of these tools had with other people. As supplementary information, they still have some use and can show that a particular collection was heavily reliant on exotic instead of local material.

Chapter 6: Cody Complex Mobility and Interactions based on Lithic Material Types

6.1 Introduction

Paleo-Indian groups of North America used mostly high quality lithic materials especially for the production of projectile points and other formal tools. These lithic materials can be from source locations that are hundreds of kilometers away; such as at the Shoop (Witthoft 1952) and Lindemeier (Hofman et. al. 1991) sites, or from relatively close source locations such as at the Bobtail Wolf and Benz sites (Root 1992).

There has been much ink expended over the discussion on just how these exotic lithic materials were transported over vast distances. Some have argued that Paleo-Indian groups procured the material themselves (e.g. Goodyear 1989; Meltzer 1984a, 1989), whereas others have argued that these exotic materials were obtained via trade (e.g. Ellis 1989; Dellar 1989; Hester and Grady 1977). However, as Bamforth (2002) suggests it is probably some of both.

Recently the distribution of lithic materials at sites has been used (Knell 2013; Knell and Hill 2012) to determine the mobility and land use pattern at both the site and regional scale for Cody Complex groups on the Northern Plains.

6.2 Paleo-Indian Mobility

Lithic material type is one of the major pieces of evidence that archaeologists have used to try and determine the mobility of Paleo-Indian groups. Lithic material type is often the focus of mobility studies for two major reasons. (1) This material is often found in abundance in archaeological sites and (2) The source locations for many types of lithic materials have been determined over the years.

Although it has been suggested (Bamforth 2009) that caution should be employed when using surface finds, Paleo-Indian surface finds are all that is found in some areas (Meltzer 1984b). In Saskatchewan, Clovis and Folsom points are mostly found as singular surface finds (Hall 2009) and although some Cody Complex sites in Saskatchewan have produced many projectile points (e.g. the Heron Eden or the Dunn sites), many more projectile points are found as singular finds. Lepper (1989) looked at the distribution and lithic material types of isolated finds of early Paleo-Indian projectile points from Ohio and based on this information he determined that these Paleo-Indians extensively exploited areas of Ohio that were previously thought to be sparsely utilized by these groups. This was determined by the large amount of high quality lithic materials from throughout the state being equally exploited; many of which have source locations from the areas previously considered sparsely exploited by Paleo-Indian groups. Much of Saskatchewan is lacking in primary high quality lithic sources, but the surface finds can still give information on lithic material types used. Using these materials it may be possible to determine interactions/movements of Paleo-Indian groups as seen by the study in Ohio.

6.2.1 Direct Procurement or Exchange

Paleo-Indian tools, in particular formal tools, are usually made from high quality cryptocrystalline materials (Goodyear 1989). The Cody Complex in Saskatchewan is no exception, with most of the recorded projectile points (and other tools) being made from Knife River flint, fused shale, or high quality grades of Swan River chert. Goodyear (1989) suggests that these high quality materials were used because their properties allowed them to be used in a highly portable and flexible technological system practiced by Paleo-Indian groups. He suggests that this is required in a highly mobile settlement pattern with a low population density (for other examples see Bamforth [1986]; Kelly and Todd [1988]). It has also been suggested that long life/flexible tools were used by sedentary groups who did not have ready access to high quality lithic materials (Kelly 1988). However, the environment of the plains is not conducive to low mobility as resources are often unpredictable (Knell and Hill 2012:42-47). In contrast Ellis (1989: 156-162) argues that social factors may have led to the selection of these high quality lithic materials.

The sizes of Paleo-Indian territorial rangers are often considered very large (e.g Amick 1996; Goodyear 1989) but it has been suggested (Bamforth 2009) that after early Paleo-Indian

times these ranges became more restricted. Also, Paleo-Indian groups in different areas may have had different sized ranges (Gardner 1977). Determining just how large Paleo-Indian ranges were is difficult. Only lithic resources which were directly procured can show possible mobility range. If the lithic resources were obtained via exchange, such information would indicate the size of their interaction sphere, which should be larger than their physical mobility range.

Tied in with this presumed high mobility is the suggestion that these Paleo-Indian groups were traveling long distances to acquire lithic resources (e.g. Goodyear 1989; MacDonald 1999:141; Meltzer 1989) and it has often been considered a good example of the scale of hunter-gather mobility (Binford 1979:261). However, there have been some suggestions that exchange was the main method that high quality exotic lithics were procured (Dellar 1989:219; Ellis 1989:154-156; Gilliam 1996:281; Hayden 1982:114-119; Hester and Grady 1977:92). In many of these cases, it is pointed out that although the projectile points are made of exotic materials, many of the other tools are made of local materials (e.g. Andrefsky 1994).

Both Dellar (1989) and Ellis (1989) suggest that exchange of lithic material was common among Paleo-Indian groups in the northeast area of North America. These exotics were used mostly to make projectile points (Dellar 1989:219). Outside of these small exchanges the focus was on local materials. Ellis (1989) suggests that the purpose of these lithic materials was to be used as an identifying marker between groups. These different Paleo-Indian groups would use one main local source and then trade for a limited amount of other lithic resources. Hayden (1982:118) suggests that there was large scale exchange of lithic resources between groups which was used to maintain social ties. These social ties would have allowed groups to minimize risk in times of stress similar to the strategy of the !Kung San of the Kalahari Desert (Wiessner 1982).

In contrast, Meltzer (1989:23) suggests that there was no utilitarian exchange of lithics because the low population density would mean Paleo-Indian groups could move when required without being impacted by other groups. Meltzer (1989:24) and others (Bamforth 2002:84-85; Ellis 1989:156; Tankerseley 1989:270) have pointed out that small amounts of exotic lithics, particularly from far distant locations, could represent exchange or the movement of one or a few individuals. So, a small amount of an exotic resource could represent direct procurement (Ingbar 1994; Reher and Frison 1980:124). Over time and/or distance, a material will get depleted and if a site is formed during a particular part of the groups “round” one or more materials may only

show up as minor part of the assemblage. A material may also be used up before site formation; therefore, at best, the material types found at a site can only determine the minimal extent of a group's territory (Ingbar 1994:49-50).

The belief that Paleo-Indian groups focused only on high quality exotic lithics (e.g. Goodyear 1989) has been challenged (e.g. Bamforth 2002; 2009). Many exotic lithic studies focus on projectile points and Bamforth (2009) indicates many good reasons for spending the effort to analyze these projectile points. However, many of these are also reasons that the focus should perhaps be placed on the other tools in the Paleo-Indian tool kit. The Jurgens site (Wheat 1979) is a Cody Complex example where many of the projectile points were made of exotic stone, but local stone made up most of the rest of the assemblage. In contrast, the lithic assemblage of the Alberta component at Hell Gap locality 1 (Knell 2009:183), was made up almost completely of high quality exotic material. However, the Cody component lithic assamblage at Hell Gap locality 1, was almost exclusively made up of the high quality local material (Knell 2009:187). These examples would suggest caution when making general statements on exotic verses local stone use based mainly on projectile points.

Andrefsky (1994) has proposed a model for why a Paleo-Indian group would use exotic and/or local materials. The model is based on quality and abundance of local lithic materials (Figure 6.1). If local materials are of high quality and high abundance, then all tool types, formal (curated) and informal (expedient), will be mostly made of local material with some minor exotic materials showing up. However, if the local material is low in abundance but of high quality, then most of the tools made from local material will be primarily formal tools. If locally available lithic material is low quality then it would be used to make primarily informal tools whether the abundance is high or low. Instead, exotic high quality lithic materials will be acquired and used to create the formal tools such as projectile points. Andrefsky (1994:26) suggests that this lithic material use pattern can show up at any type of site (e.g. kill or camp site).

An area with low quality and a low abundance of lithic material is the Southern High Plains (Holliday 1997:13). In Holliday's (1997) overview of Paleo-Indian material recovered from the Southern High Plains, exotic materials from other parts of the Southern Plains dominate the projectile point assemblages (see Holliday 1997: Appendix 2 for a full list of the exotic materials used on the High Plains). Other studies (Amick 1996; Bement 1999) on Paleo-Indian

		Lithic Material Quality	
		High	Low
Lithic Abundance	High	Formal and Informal Tools	Primarly Informal Tools
	Low	Primarly Formal Tools	Primarly Informal Tools

Figure 6.1. Chart showing the types of tools that would be made on locally available materials; based on the quality and abundance of those materials.

lithic resource use on the Southern Plains have agreed with this, showing that a few high quality lithic materials were used throughout the Southern Plains including the Southern High Plains. Some of these materials include Edwards Formation chert, Alibates agate and Potter chert. The Midwest shows a similar focus on a few material types with over 75% of the Paleo-Indian material examined from Indiana, Ohio and Kentucky originating from three different bedrock sources (Tankerseley 1989:271). The assemblage from Lubbock Lake shows the use of low quality lithic materials for other tool types, in particular informal tools such as minimally and unmodified flakes (Bamforth 1985:253). In this same study, the exotic materials showed high levels of curation (resharpening and repair of tools) whereas the local material showed minimal to none.

This tendency for Paleo-Indian groups to use a limited number of lithic sources for formal tool manufacture may be due to a focus on using bedrock sources (Ellis 1989:139; Tankerseley 1989:261). However, it has been suggested that secondary sources were exploited (Meltzer 1984a) and they were even an important source of lithic material (Gardner 1983:50-51). While secondary sources were probably exploited on an opportunistic basis (Tankerseley 1989:261), the amount of high quality material in large enough nodules to make Paleo-Indian projectile points and other tools was probably not enough to sustain the Paleo-Indian tool kit (Meltzer 1989:18-19).

Saskatchewan is similar to the Southern High Plains where there is a lack of high quality lithic materials with bedrock sources. The only lithic material from Saskatchewan with known bedrock outcrops is fused shale. All the other materials are found in secondary deposits (Johnson 1998:28). Fused shale is also one of the best locally available materials to be found in Saskatchewan and makes up the third highest amount of Cody Complex diagnostics recorded in

Saskatchewan (Table 6.1). Knife River flint and Swan River chert make up the number one and two, respectively, material types used to make Cody Complex projectile points. These latter two were probably used more for projectile point manufacture because they were more durable and would need less resharpening/replacing.

Table 6.1. The lithic material of all recorded Cody Complex Diagnostic in Saskatchewan

Material	Amount	Percent (%)
Knife River Flint	281	48.2
Swan River Chert	89	15.3
Fused Shale	64	11.0
Cherts	59	10.0
Minor Exotics€	25	4.3
Quartzite	14	2.4
Silicified Materials*	13	2.2
Beaver River Sandstone	10	1.7
Chalcedonies	10	1.7
Silicified Peat	6	1.0
Unknown+	5	0.9
Obsidian	3	0.5
Miscellaneous	3	0.5
Feldspathic Siltstone	1	0.2
Totals	583	100

€ This category includes things such as Agate and Jasper that are usually if not always found outside Saskatchewan

* This includes all the silicified materials not in their own category such as silicified wood and silicified siltstones

+ These are listed as unknown because that is what they were identified as in the literature

In Table 6.1 many of the categories are made of a single material type. For example, the Knife River flint category is all the material identified as Knife River flint (or brown chalcedony) and the Swan River chert category includes all the different colours of the material, whether they had been heat treated or not. However, some categories require some minor clarification. The

chert category includes all the different types of chert that were identified as not being Swan River chert. These materials include all kinds of colours and qualities. As there is no way to determine where these materials came from they were all combined together. This category of material is also considered local at a regional level because the materials could be obtained from almost anywhere and at anytime. Many of these materials were probably not specifically sought after like Knife River flint or fused shale. The chalcedony category is much like chert with the material ultimately being considered local at the regional level.

The quartzite material is also a category of multiple types, but like the chert and chalcedony material, quartzite cannot be sourced without using methods such as petographic analysis or mass spectrometry. However, quartzite can be found throughout all of Saskatchewan and so is considered a local material. The unknown category is material that was unidentified. A few authors mentioned not knowing what the material was and this identification was maintained if there were no photographs to provide clarity. It is impossible to put these materials into the exotic or local categories, although the former is more likely. However, because only a few specimens are involved, it should not affect the results.

The miscellaneous category includes a couple of material types that were found in very few numbers (as Cody Complex diagnostics). These materials are also those that often do not make very good projectile points, such as quartz, and because of this they would rarely show up in a study focused on projectile points. The materials in this category were probably found throughout Saskatchewan, but if that is incorrect, the minimal amount of them would have a small effect on the results.

This focus on a few bedrock sources has been used to suggest Paleo-Indian movement in both the northeast part of North America and on the Southern Plains. On the Southern Plains, Bement (1999:170) suggests that there were two major Folsom territories based on the distribution of points made from different lithic sources. Sites, such as the Cooper site in northwestern Oklahoma, that have an abundance of material from all these source locations are suggested as being meeting places between these territories (Bement 1999:172).

Tankerseley's (1989:271-272) study in the Midwest suggests that mobility was limited in the southern areas of the study region when compared with glaciated parts to the north. This is due to the presence of lithic bedrock sources in these southern regions. He also feels the

distribution of material from these source areas shows the real mobility of the people exploiting the area (Tankerseley 1989:269-272).

A similar focus on bedrock sources of high quality lithic material can be seen on the Northern Plains. At the Agate Basin site, located in east-central Wyoming, a large number of tools and projectile points made from Knife River flint were recovered from all the components of the site (Frison and Stanford 1982:176). The Knife River flint quarries are located over 500 km away from the site. Many other lithic materials from hundreds of kilometers away are also found at the site suggesting that the users of the Agate Basin site ranged over a large area including northern Colorado, south-central Montana and central North Dakota (Frison and Stanford 1982:173-178).

The Cody Complex material at the Hell Gap site also shows a similar focus on bedrock sources of lithic material, but with a different distribution pattern (Knell 2009). Sixty percent of the Alberta assemblage comes from source locations within 200 km in a western direction from the site with the rest made from locally available material (Knell 2009:183-184). In contrast, the Cody component lithic material was over 99% local (Knell 2009:187). Knell (2009; 2013) suggests that this means the Alberta component was a short term occupation of people moving over a large area whereas the Cody component was a longer term occupation of people moving over a smaller area. Possibly, the Cody group may have been mostly restricted within the Hartville Uplift area (Knell 2013:265).

In the grassland areas of the Northern Plains, most resources are unpredictable and in the case of lithic materials often of poor quality (Root et. al. 2013:122). Therefore, areas with high-quality toolstone would have been repeatedly occupied. On the Northern Plains, the Knife River flint quarry area would be one such location (Root 1992). Such locations have been suggested as being aggregation locations on the Great Plains (Gardner 1977; Hofman 1994). This would support the proposal that Knife River flint was traded into areas south of the quarry area (Root et. al. 2013:125). However, direct acquisition was probably the method for dissemination of the material north into Canada (Root et. al. 2013:125). Many Cody Complex sites in Saskatchewan have Knife River Flint as the majority lithic material, often over 50%, which has been suggested as being a good indication it was directly acquired (Tankerseley 1989:271).

6.3 Land Use Interpretations based on Lithic Material

More recent studies (Knell 2009, 2013; Knell and Hill 2012; Root et. al. 2013) on Cody Complex lithic material use have employed lithic material types to determine the land use patterns of individual sites and small regions instead of focusing on the maximum extent of territory that may have been exploited. Comparisons between the amount of local versus exotic lithic material found at Cody Complex sites were used to determine if the inhabitants were practicing a regional or non-regional land use approach (Knell 2013:249-254; Knell and Hill 2012:42-47). Exotic lithic materials are those which have source locations from over forty kilometres (40 km) away from the site or find location (Knell and Hill 2012:58). This distance was first proposed for the use in Paleo-Indian studies by Meltzer (1989:31) based on ethnographic work in Australia on how far unmodified stone would be carried before being processed (Gould and Sagger 1985:119).

Knell and Hill (2012) described a regional land use pattern as using the site repeatedly well exploiting the surrounding terrain. The resources used would include locally available lithic materials which would eventually be used to replace material obtained from elsewhere. However, if a nonregional land use approach was being used the site would not be used long enough for local lithic materials to replace a significant portion of the tool kit. This would lead to the discard of mostly exotic lithic materials at the site.

Knell and Hill (2012:42) based this work on a land use model that was based on optimal foraging theory and temporal resource predictability theory. They applied it to a number of sites and areas throughout the Northwest Plains that contained Cody Complex components. The areas consisted of numerous surface recoveries of projectile points found within close proximity. Similar areas of surface finds have been used in other Paleo-Indian studies (Tankerseley 1989:263).

Based on the model it was predicted that sites in grassland areas, including most of southern Saskatchewan, should show a nonregional land use pattern throughout most of the year (Knell and Hill 2012:46). Unfortunately, lithic material cannot determine the season that sites were occupied and only one site from Saskatchewan, the Heron Eden site, has such information available. The Heron Eden Site had a fall or winter occupation (Corbeil 1995). However, most sites in the grassland regions of the Northwestern Plains should show a nonregional land use

pattern or indeterminate if they were occupied multiple times over the course of the winter and another season.

In total, 55% of the sites from the grassland region showed a nonregional land use pattern with the rest showing an indeterminate land use pattern (Knell and Hill 2012:65). However, several sites tested as nonregional in land use pattern based on projectile point discard, but were interpreted as being indeterminate (Knell and Hill 2012:64). This model was taken and applied to the Cody Complex components from the Hell Gap site which showed different land use patterns by different groups at different times (Knell 2013). Hell Gap is just one example of Paleo-Indian groups repeatedly using the same location (Bamforth 2005).

In this land use study, first employed by Knell and Hill (2012), tools other than projectile points were used to perform a second test on the assemblage when possible. No sites examined in the study, from the grassland or other ecological areas, showed the opposite results in the non-tool lithic material test when compared to the projectile point only test. Only three sites (16%) where both tests could be utilized on showed indeterminate in one result then regional or nonregional in the other (Knell and Hill 2012:64). This would suggest that when only projectile points and Cody Knives are available that the land use strategy can be determined with some certainty. It should also be noted that the type of site, e.g. camp versus kill, will often affect the type of tools discarded (Bamforth 1991:217). However, this does not seem to affect whether a site shows regional or non-regional land use. The analysis of Cody Complex sites suggests that some sites, such as workshops, show similar land use patterns (Knell and Hill 2012). In contrast, most types of sites such as kill sites will show both regional and nonregional land use patterns. Therefore, the type of site does not necessarily suggest a particular land use strategy.

The same sites and areas in Saskatchewan examined by Knell and Hill (2012) were re-examined with some new information. This was information that was gathered and included along with the information used in the orginal publication by Knell and Hill (2012). One example of this is the Niska site where more material has been collected since the original publication by Meyer (1985). It is suspected that this new data will not change the original landuse pattern determined by Knell and Hill (2012). New sites and regions from Saskatchewan will also be examined.

6.4 The Land Use Pattern of Cody Complex in Saskatchewan

Cody Complex sites and areas of concentration will be examined similarly to the study by Knell and Hill (2012). There is one major difference between Knell and Hill's (2012) study and this one. Instead of just projectile points, all the Cody Complex diagnostics, projectile points, Cody knives and modified projectile points are used. Modified projectile points include square hafted artefacts, such as drills, that may have originally been projectile points. Due to the chiefly surface find nature of the artefacts, no other tools can be firmly assigned to the Cody Complex beyond these diagnostic items. This test will be referred to as the Diagnostic Lithic Test and the formula to determine the diagnostic tool index (DI) is as follows after the formula used by Knell and Hill (2012:58):

$$DI = \sum \text{Local Lithic Material Diagnostic Tools} / (\sum \text{Local Lithic Material Diagnostic Tools} + \sum \text{Nonlocal Lithic Material Diagnostic Tools}).$$

Diagnostic tool index values ≥.80 represent a high proportion of diagnostic materials made from local lithic sources and suggests a regionally restricted land use. Diagnostic tool index values ≤.25 represent a high proportion of diagnostic materials made from exotic lithic sources which suggests a nonregional land use strategy. A number in between these two is considered indeterminate and is not evidence supporting either land use strategy.

As well as this determination of land use strategy, the different types of lithic material will be examined. Based on source locations (Chapter 5), if known, the possible extent of mobility by the group who discarded the material at the site or in the area will be examined. After the individual sites are examined, a larger area approach will be briefly utilized. Multiple sites in an area with a similar time period (e.g. , Cody Complex) are required to truly determine what area may have been exploited by a group of people (Thurmond 1990).

6.5 Land Use and Interactions at a Site and Area level

6.5.1 Niska Site

The Niska site is a Cody Complex camp site from southwest Saskatchewan that was originally excavated in the early 1980's (Meyer 1985). In the original publication, thirteen tools were recorded that would be usable for the diagnostic tool index: including five Cody Knives

and eight projectile points. In the summer of 2013, the author recorded thirty-two diagnostics from the Niska material in the Notukeu Heritage Museum located in Ponteix, Saskatchewan. These included the previously reported materials plus others recovered after 1985.

The most common material type that diagnostic items are made of is fused shale with a total of sixteen artefacts (Table 6.2). The next most common material was Knife River flint with twelve diagnostics. The remaining diagnostic items are each made of a different type of material such as agate, chalcedony, silicified material and jasper. All of these are considered exotic to the Niska site. The diagnostic tool index for this material at this site equals zero (0.0). This suggests that the Cody Complex group that used the Niska site were practicing a nonregional land use approach.

The lithic material from this site would suggest the group had moved in from the southeast. Known sources of fused shale, the most common lithic material used on formal tools at the site are all to the southeast. Sources of fused shale in another direction are not impossible; however, the high proportion of Knife River flint, second highest lithic type, is only available to the southeast. Most of the other tools, e.g. endscrapers, found at the site are also made from Knife River flint or various chalcedonies and cherts which also suggest interactions to the southeast.

Table 6.2. Lithic material of Cody Complex diagnostics from the Niska Site.

Material	Amount	Percent (%)
Fused Shale	16	50.0
Knife River Flint	12	37.5
Agate	1	3.1
Chalcedonies	1	3.1
Jasper	1	3.1
Silicified Materials	1	3.1
Totals	32	100

The non-diagnostic artefacts provide more evidence for interactions with the southeast. However, as shown by Andrefsky (1994), in a region lacking in high quality lithic materials,

such as Saskatchewan, the diagnostics by themselves are a good indication of a group's territory/movements.

6.5.2 Heron Eden Site

The Heron Eden Site is a Cody Complex kill site (Corbeil 1995) in the southwest part of Saskatchewan. A large amount of bison bone was recovered from the site, but the number of diagnostic lithic tools recovered from the site was much smaller. Only fourteen projectile points were recovered from the site (Corbeil 1995:18). Eight of the projectile points were identified as Scottsbluff, one as Eden and the remaining five are either of distal or stem fragments. No Cody knifes were identified in the collection but assorted other lithic tools such as endscrapers, a burin, and retouched flakes were excavated from the site. Eight of these points were in the collection of the University of Saskatchewan and were re-examined by the author.

Two points were identified as being made from Beaver River Sandstone, based on petrographic analysis (Table 6.3). Two points were also identified as being made from agate which probably originated from Montana (Linnamae and Johnson 1999). Three points were made from Knife River flint and two from jasper. The remaining points were made from various materials found in Saskatchewan including silicified wood and, cherts. However, none of the materials have a known source location near the site except for one possible Swan River chert point. This gives a diagnostic index of 0.07 which suggests a nonregional land use pattern.

However, the analysis of the lithic material from the Heron Eden site indicates that final shaping, re-working and rejuvenation of tools were the major lithic activities undertaken at the site (Corbeil 1995:21). This may suggest that the inhabitants had been spending some time in the area before the formation of the Heron Eden site and that new lithic material sources were not available nearby or had not been accessed recently. Many of the non-diagnostic formed tools are made from similar exotic materials, whereas more expedient tools such as unifaces were made from local materials (Corbeil 1995:20).

The lithic material types recovered from the Heron Eden site show a range of different origin locations. Beaver River sandstone is found in northeastern Alberta several hundred kilometers northwest of the Heron Eden site. In contrast, the rest of the exotic lithic material is found from southern areas. The agate and jaspers are probably from Montana and the Knife River flint would be found southeast of the site. This wide area of lithic material origins

suggests that the inhabitants of the Heron Eden site had interactions over a large area. There are, however, no strong indicators of where major interactions may have occurred.

Table 6.3. Lithic material of Cody Complex diagnostics from the Heron Eden Site.

Material	Amount	Percent (%)
Cherts	5	35.7
Knife River Flint	3	21.4
Agate	2	14.3
Beaver River Sandstone	2	14.3
Swan River Chert	1	7.1
Silicified Materials	1	7.1
Totals	14	100

6.5.3 Napao Site

The Napao site is a Cody Complex site near the town of Ponteix in southwest Saskatchewan. The author was able to record twenty-one diagnostic items that were recovered from this site (Table 6.4). All the material examined was collected by Henry Libiron and housed at the Notukeu Heritage Museum in the town of Ponteix, Saskatchewan.

Most of the diagnostic items were made from fused shale and Knife River flint with each material type represented by nine diagnostics or 42.9 percent of the collection. One diagnostic item was made from obsidian, with the remaining two made from local materials. One was made from a type of chert and the other from Feldspathic siltstone. The diagnostic index for the Napao site is 0.10. This would suggest a nonregional land use pattern.

Several other tools and lithic debitage from the site were made of feldspathic siltstone. Due to the difficulty of working the material, it was not often made into projectile points or Cody knives. This suggests that feldspathic siltstone is probably underrepresented among the diagnostic materials. However, the amount of the feldspathic siltstone in the entire collection was minimal and should not change the perceived land use pattern of the site.

Table 6.4. Lithic material of Cody Complex diagnostics from the Napao site.

Material	Amount	Percent (%)
Fused Shale	9	42.9
Knife River Flint	9	42.9
Cherts	1	4.8
Feldspathic Siltstone	1	4.8
Obsidian	1	4.8
Totals	21	100

The types of lithic material suggest a focus on southeastern interactions. Known fused shale source locations are southeast of the site location. Other sources of fused shale are certainly possible, but these would probably be to the south and southeast of the site if they exist. Knife River flint is also only available to the southeast. This suggests that the inhabitants of the Napao site may have been moving in a northeast direction through Saskatchewan.

6.5.4 Dunn Site

The Dunn site is a Cody Complex site from southeastern Saskatchewan located near the town of Ogema (Ebell 1988). In total, ninety-one diagnostic items have been recovered from the Dunn site (Table 6.5). Most (eighty-six) of the recovered artefacts from the site are made from Knife River flint, totalling 94.5%. The remaining five diagnostics are split among four different types of lithic material: two made of jasper, one of fused shale, one of chert and one of quartzite. The Knife River flint, jasper and fused shale are all exotic materials. The chert and quartzite diagnostics could just as easily be local or exotic in origin. However, the site itself is almost devoid of any rock that was not artefacts.

The diagnostic index for the Dunn site is almost zero (0.02) which would suggest a nonregional land use strategy. The lithic material types used at the Dunn site (mostly Knife River flint) suggests strong ties towards the southeast into the Knife River flint quarry area. This large amount of material from this area may suggest that the people who used location of the

Dunn site had recently spent time in North Dakota and may have been moving northwest through Saskatchewan.

Table 6.5. Lithic material of Cody Complex diagnostics from the Dunn site.

Material	Amount	Percent (%)
Knife River Flint	86	94.5
Jasper	2	2.2
Fused Shale	1	1.1
Chert	1	1.1
Quartzite	1	1.1
Totals	91	100

6.5.5 Farr Site

The Farr site is located in the southeastern part of Saskatchewan near the town of Ogema. It is a multicomponent site that contains a fair amount of Cody Complex material. The site has only undergone surface collection. As a result of this and the multicomponent nature of the site, only the diagnostic artefacts are considered in the analysis of the site.

In total, forty-nine Cody Complex diagnostic items have been recovered from the Farr site (Table 6.6). The most striking difference between this site and the nearby Dunn site is the great variety of lithic materials used at the Farr site. The most common material, various cherts, makes up about 35% of the Cody Complex material at the Farr site. The next most common material at the Farr site is Knife River flint (about 27%). The rest of the material is spread among eight different material types with the most abundant being different types of agate (about 12%). However, all the material recovered from Farr site is probably nonlocal in origin which would give the site diagnostic index of 0.0. This is indicative of a nonregional land use strategy.

The diversity of material types at the Farr site is interesting, especially when compared to the nearby Dunn site. The fairly high amount of Knife River flint at the Farr site would suggest that the people who discarded or lost the Cody Complex material at the site had interactions in a southeast direction. However, unlike the Dunn site, the intensity of interaction with the Knife

River flint quarry area is much less significant. The inhabitants of the Dunn site may have recently been to the Knife River flint quarries, whereas the people who used the Farr site either had not been there in awhile or had to trade for the Knife River flint that they used.

Table 6.6. Lithic material of Cody Complex diagnostics from the Farr site.

Material	Amount	Percent (%)
Cherts	17	34.7
Knife River Flint	13	26.5
Agate	6	12.2
Silicified Material	4	8.2
Fused Shale	3	6.1
Swan River Chert	2	4.1
Chalcedonies	1	2.0
Jasper	1	2.0
Quartzite	1	2.0
Unknown	1	2.0
Totals	49	100

Most of the material recovered from the Farr site can be found throughout parts of Saskatchewan which suggests that they may have been resident in Saskatchewan for some time before arriving at what became the Farr site. Overall, the lithic material left behind at the Farr site would suggest that the Cody Complex inhabitants had some interactions to the southeast, particularly, the Knife River flint quarries. However, other than that, it appears most of the interactions/movements before the formation of the Cody component(s) at the site may have been more localized within Saskatchewan. These Saskatchewan interactions were probably with more northern areas as there was minimal amount of fused shale but a significant amount of cherts and other materials found in small amounts throughout Saskatchewan. If the movement was more in the southern parts of Saskatchewan then the amount of fused shale in the assemblage would probably be greater.

6.5.6 McLeod Site

The McLeod site is a multicomponent site in southeastern Saskatchewan, located near the town of Radville. The site has only undergone surface collecting. This, combined with the multicomponent nature, means only the diagnostic material is considered in the lithic material analysis. In total eight-two Cody Complex diagnostics (Table 6.7) have been identified by Joyes (1997). All of the identified lithic materials at the site are exotic in origin. This gives the site a diagnostic index of 0.0 meaning a nonregional land use pattern. A significant portion, 76.8%, of the material is made from Knife River flint with the next most abundant material, fused shale, making up 8.5% of the total. The rest of the materials identified at the site are jasper, slate, obsidian and various cherts and chalcedonies.

Table 6.7. Lithic material of Cody Complex diagnostics from the McLeod site.

Material	Amount	Percent (%)
Knife River Flint	63	76.8
Fused Shale	7	8.5
Cherts	5	6.1
Jasper	3	3.7
Chalcedonies	2	2.4
Obsidian	1	1.2
Slate	1	1.2
Totals	82	100

The large amount of Knife River flint material would suggest that the people who used the McLeod site had strong recent interactions in a southeast direction. This probably took the form of obtaining Knife River flint material from the Knife River flint quarries in North Dakota. The other, roughly, 25% of material was probably procured while moving across the landscape to supplement their tool kits.

6.5.7 Quill Lakes Area

The Quill Lakes area consists of a number of sites around the Quill Lakes in the east-central portion of Saskatchewan. A fair amount of Cody Complex material has been surface collected from this region. The most common lithic material that these Cody Complex diagnostics are made from is Swan River chert (Table 6.8). Just under half the diagnostics (48.6%) are made from this material. Due to the prevalence of Swan River chert in the area it is considered a local material. Only two other lithic material types were used, if two specimens made from unknown materials are disregarded, to make Cody Complex diagnostics in this area. These are Knife River flint and various types of other chert.

Table 6.8. Lithic material of Cody Complex diagnostics from the Quill Lakes area.

Material	Amount	Percent (%)
Swan River Chert	18	48.7
Cherts	10	27.0
Knife River Flint	7	18.9
Unknown	2	4.5
Totals	37	100

The various types of cherts make up 27.0% of Cody Complex materials in this area and Knife River flint makes up 18.9%. Both of these material types would be considered exotic to the area. This makes the diagnostic tool index for this area 0.49 which means that the land use strategy is indeterminate. Although there are significant amounts of local material used, the Cody Complex people who were using the area may not have been in the area for very long as the sites observed in the area are small and appear to be lightly used. The Swan River chert was the best guaranteed available lithic material to rejuvenate their tool kits.

The areas of interactions suggested by the lithic material are fairly ambiguous. The Knife River flint would suggest interactions to the south. Due to the low amount of Knife River flint it is possible that the people in the area may have traded for it. However, it could also mean that there had been a significant amount of time since any of these Cody Complex sites were formed

after the exploitation of the Knife River flint quarry areas. It appears that there was a dependency on local materials from around the area and other materials found throughout adjacent parts of Saskatchewan.

6.5.8 Bjorkdale Area

A number of archaeolgoical sites have been found around the town of Bjorkdale in the east-central area of Saskatchewan. Only surface recoveries have been made in the area and only a few of these sites have produced Cody Complex material. Few different lithic types have been identified among the Cody material recovered (Table 6.9). Most of the Cody Complex diagnostics recovered are made from Swan River chert (71.4%). Various other cherts make up most of the remaining diagnostics in the area (21.4%) and Knife River flint makes up the remainder (7.1%).

Table 6.9. Lithic material of Cody Complex diagnostics from the Bjorkdale area.

Material	Amount	Percent (%)
Swan River Chert	10	71.4
Cherts	3	21.4
Knife River Flint	1	7.1
Totals	14	100

The overall area these sites are located in is fairly small, thus the amount of Cody Complex material recovered is also minimal which means interpretations can be hard to make. However, the diagnostic index of 0.71 means the land use pattern is indeterminate. This is close to the threshold for a regional land use pattern. The Cody Complex people who used this area focused mostly on lithic materials found locally and throughout east-central Saskatchewan. Thus, one can suggest that their movements were probably focused on the more central portion of Saskatchewan than with other areas. However, the presence of minor amounts of Knife River flint does show interactions with to the south. These were fairly limited and possibly is evidence of trade with people to the south instead of direct acquisition.

6.5.9 Radisson Area

A small number of Cody Complex diagnostics have been recovered from the surface of several sites around the town of Radisson in west-central Saskatchewan. The diversity in material types from these sites is substantial, with eight different material types recorded (Table 6.10). None of the material types takes up a huge bulk of the total with Beaver River sandstone being the most abundant at 29.4%. Various cherts are the next most common at 23.5% with the remaining diagnostics split among six lithic material types.

Table 6.10. Lithic material of Cody Complex diagnostics from the Radisson area.

Material	Amount	Percent (%)
Beaver River Sandstone	5	27.4
Cherts	4	23.5
Knife River Flint	2	11.8
Swan River Chert	2	11.8
Chalcedonies	1	5.9
Obsidian	1	5.9
Quartzite	1	5.9
Basalt	1	5.9
Totals	17	100

Most of the materials found in these sites are considered exotic in origin, giving a diagnostic index rating of 0.18. This suggests the land use strategy practiced by the Cody Complex people in this area was nonregional. The large diversity of material types from different regions matches up well with this land use strategy.

The Radisson area shows lithic material from a wide range of locations. From the south there is Knife River flint and obsidian and from the northwest there are points are made from Beaver River sandstone. The material in this area appears almost identical to the material identified as Beaver River sandstone from the Heron Eden Site and it is also relatively closer to

the Beaver River source area. The various types of cherts and chalcedonies could have been acquired from anywhere in Saskatchewan or elsewhere. There are also diagnostics made from Swan River chert and quartzite of both which can be found locally.

Most of the material types recovered from this area can be found throughout Saskatchewan. This suggests that the Cody Complex people who were using this area had been spending a significant amount of time in the province and were using locally found materials to produce most of the items in the tool kit. The most common exotic with an extremely distant origin is Beaver River sandstone which suggests some interaction with northeastern Alberta. Although, Beaver River sandstone makes up almost 30% of the material from around the Radisson area when compared to the Cody materials from west central Saskatchewan it is much less abundant (see below).

Cody Complex material has been recovered from the Beaver River sandstone quarry area of Alberta. However, trade and not direct procurement may be the method by which Beaver River sandstone moved into these parts of Saskatchewan. Since the high proportion of Beaver River sandstone is seen in the Radisson area, perhaps only a few or one individual moved into the area with the material; however, for reasons discussed above, direct procurement is not an impossibility. The minor amounts of Knife River flint and obsidian found in the area also point to interactions with the south and southeast. Trade is a likely explanation but other factors contributing to their presence are not impossible. Regardless, the Cody Complex inhabitants of this area had access to a diverse amount of material.

6.6 Land Use and Interactions at a Regional Level

Knell (2013) showed that the land use pattern for a region can be determined using the same lithic sourcing technique that was used at the site or area level. A regional approach is also required to get a better reflection of source material exploited by Cody Complex peoples in Saskatchewan (Thurmond 1990). By using a regional approach, more data can be included than just using larger sites and clusters of sites. Sites with small numbers and individual finds can also be used in an examination such as this. Such information may also help balance out the bias that an individual site might show.

For this part of the study, Saskatchewan was broken up in to four regions: Southeast, Southwest, East-central and West-central (Figure 6.2). The north and south are divided by an

east-west line roughly along the South Saskatchewan and Qu'Appelle Rivers. The east and west of the province was divided by a north-south line that was chosen to run down the middle of the province splitting it in half. These two lines create the four different study areas. The most northern extent of the study does not have a particular or strongly defined boundary but the most northerly reported Cody Complex material in Saskatchewan is not far north of Prince Albert. These four broad portions were chosen because most of the material examined is from small finds, often of a single diagnostic artefact, scattered over a large area. Other studies that examine lithic material types often focus on sites, but the number of sites with a significant amount of Cody material in Saskatchewan is few and they are all located in the more southern portion of the province.

The material in each area will be classified as local or exotic and then a similar diagnostic index number will be applied to it. In this analysis some materials which would have been exotic for individual sites are now considered local. The most notable change is unknown cherts and chalcedonies which are considered local since they can be found anywhere. Also, some materials like fused shale will be local to southern regions and exotic to the central regions. Major possible trade or movement patterns suggested by the material will also be explored, similarly to each individual site and area.

6.6.1 Southeast Region

The Southeast Region is most notable in how the recorded diagnostic material is distributed. A total of 225 (Table 6.11) diagnostics from five different sites were recorded in this region. This is a much larger concentration per site then seen in the other regions. However, the concentration is heavily skewed as 222 of the points were recorded from just three of the sites. All of these sites have only produced surface finds.

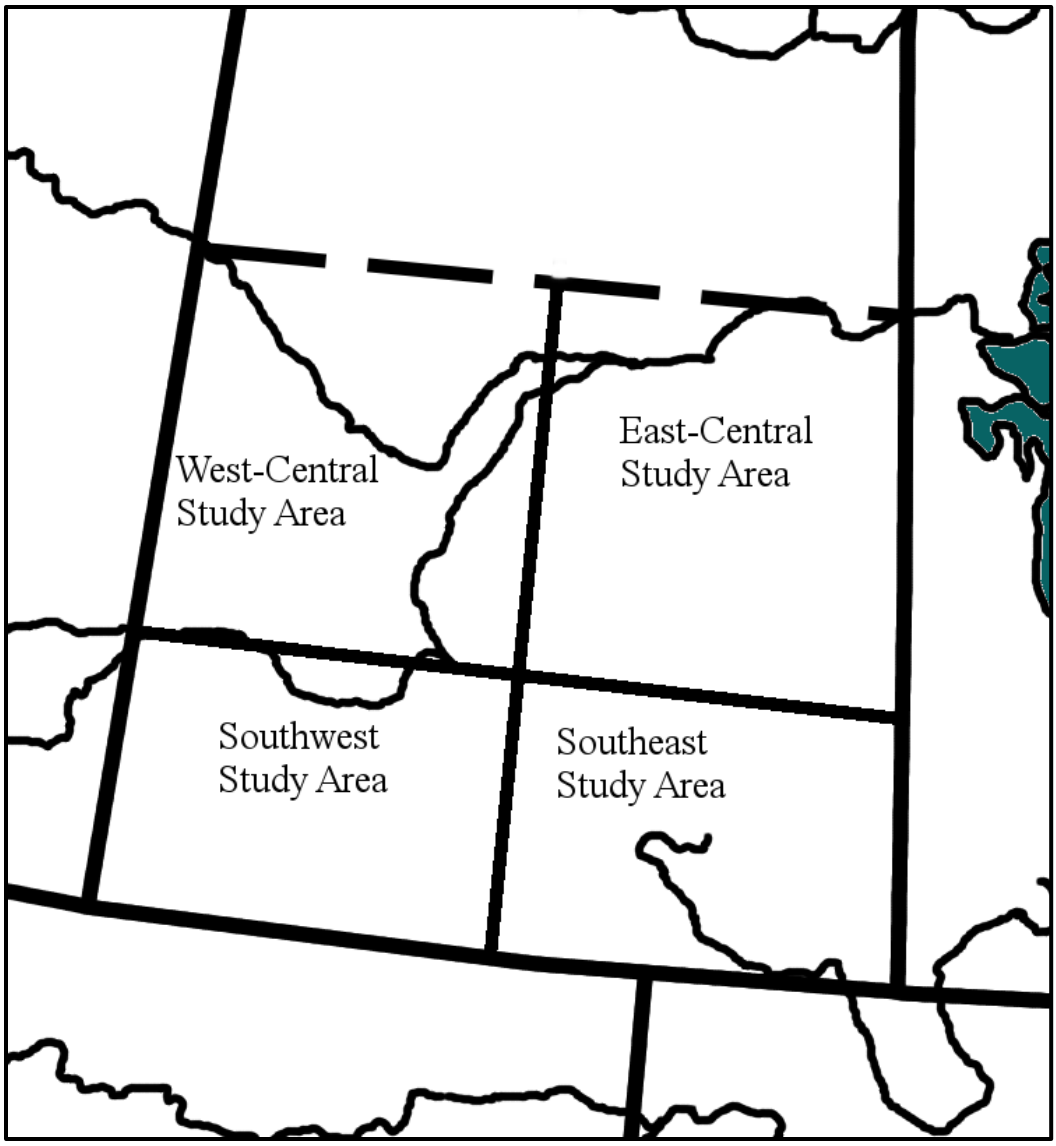

Figure 6.2. Borders of the four regional levels.

Most of the material from this area (78.6%) would be classified as exotic to the Southeast Region. The most common material is Knife River flint which comprises 73.3% of all the lithic material used to make diagnostics in the region. The second and third most common materials are both local to the region with various cherts making up 10.2% and fused shale making up 5.3%. Minor Exotic material (e.g. agate, jasper) is the only other material that makes up more (4.9%) than 2%. The prevalence of Knife River flint is not surprising as the Knife River flint quarry area is less than 300km away and such movement of material be Paleo-Indian groups is fairly common. This make up of material gives this area a diagnostic index of 0.19. This

suggests that the Cody Complex groups were practicing a nonregional land use pattern in the area; the same pattern seen in the analysis of the three major sites recorded in this area.

The extremely high amount of Knife River flint, almost 75%, is perhaps a little unexpected. Good quality material, fused shale, is readily available much closer than Knife River flint but it makes up a fairly small part of the overall total. This suggests that there was a preference for Knife River flint over fused shale, or any other material. It could also suggest, however unlikely, that outcrops of fused shale were not well known to Cody Complex people in this part of Saskatchewan.

Table 6.11. Lithic material of Cody Complex diagnostics from the Southeast Region

Material	Amount	Percent (%)
Knife River Flint	165	73.3
Cherts	23	10.2
Fused Shale	12	5.3
Minor Exotics	11	4.9
Silicified Materials	4	1.8
Chalcedonies	3	1.3
Swan River Chert	2	0.9
Quartzite	2	0.9
Obsidian	1	0.4
Miscellaneous	1	0.4
Unknown	1	0.4
Total	225	100

Due to the large amount of Knife River flint in the area, the Cody Complex inhabitants had significant interactions to the south, particularly with the Knife River flint quarry areas. The large amounts of the material would mean that it was procured directly and not traded into the region. Trade may have been possible for some of the individual sites in the area, such as the

Farr site, where it makes up about 27% of the total. However, it seems impractical for all the Knife River Flint in the region to be traded in.

The other exotics, although not very common, making up only 5.3% of the total material also show a southern bias. The remaining material can be found in Saskatchewan and was probably opportunistically added to the tool kit as people moved across the landscape. Overall the lithic material in this region suggests movement of people from the Knife River flint quarry areas north into Saskatchewan. Due to sampling conditions, the three major sites are found near each other so there may be some bias. More work in other parts of this region would be important to determine if this trend holds up.

6.5.2 Southwest Region

The Southwestern Region has the second largest sample size after the Southeastern Region, with a total of 140 specimens (Table 6.12). The diversity of material is similar to the Southeastern Region but the composition is different. Once again, Knife River flint is the most common lithic material used to make Cody Complex diagnostics, but in this region it makes up less than fifty percent of the total (47.9%). The next most common material is fused shale (33.6%). This is the area of Saskatchewan where fused shale appears to be most frequently used by the Cody Complex. Together, Knife River flint and fused shale make up over 80% of the recorded material. The rest of the materials are found at fairly low percentages of five or less.

More than half the material used to make Cody Complex diagnostic items in this region are made from exotic materials (55.0%). This gives a diagnostic index for this region of 0.44. This puts the suggested land use pattern used by the Cody Complex into the indeterminate category. However, the three major sites in this region all had a non-regional land use pattern.

Almost all the exotic material is Knife River flint, like the Southeast Region, but at a much lower overall percentage. Given to the amount of Knife River flint, it was probably directly procured and not obtained through trade. The lower percentage of Knife River flint, compared to the other southern region, is probably due to distance from the Knife River flint quarry areas. More tools would have to be replaced due to greater time and distance, leading to a lower percentage of Knife River flint. Given the elevated number of Cody Complex diagnostics of fused shale it was probably the preferred material to replace the Knife River flint. This would be so as fused shale is the highest quality material that can be found in the region. Various cherts,

chalcedonies and other materials were probably found in the area and exploited in an opportunistic manner.

There are also several other interesting exotic materials recovered from this area. The obsidian and Montana agates show more interactions with the south. For these materials, trade is a more likely method of acquisition due to the minimal amount. However, the most interesting exotic is the Beaver River sandstone of which only two specimens were recovered. However, they do suggest interesting links to the northeast. The small amount suggests that trade or the movement of a few individuals may be responsible for this material's presence in this part of Saskatchewan. Much of this area is twice as far away from the Beaver River sandstone quarry area as it is from the Knife River flint quarry area.

Table 6.12. Lithic material of Cody Complex diagnostics from the Southwest Region

Material	Amount	Percent (%)
Knife River Flint	67	47.9
Fused Shale	47	33.6
Minor Exotics	7	5.0
Cherts	6	4.3
Silicified Material	3	2.1
Chalcedonies	3	2.1
Beaver River Sandstone	2	1.4
Silicified Peat	2	1.4
Obsidian	1	0.7
Feldspathic Siltstone	1	0.7
Unknown	1	0.7
Total	140	100

Overall this area has a more interesting set of lithic materials than the Southeast Region. There is a greater focus on local materials when compared to the other southern region, but also the presence of materials from a greater number of different areas. There are definitely strong

ties toward the southeast but there are also interesting indications that there were interactions with other areas such as northeast Alberta. The greater preponderance of local materials is probably due mostly to the close distance of fused shale source areas and the greater distance from other source areas such as the Knife River flint quarry area.

6.6.3 East-central Region

The East-central Region of Saskatchewan area has the least recorded Cody Complex diagnostics, with a total of 101 items (Table 6.13). A smaller inhabitable physical area may have contributed to less Cody Complex material being found in this area of Saskatchewan. Much of this area would have been covered by Glacial Lake Agassiz during the time Cody Complex people were in Saskatchewan. Some of Glacial Lake Agassiz's higher beach lines, the Upper and Lower Campbell, were formed during the Cody Complex period (Pettipas 2011:119). This area also has the lowest diversity of material types with only five different categories. One of these categories consists of unidentified lithic materials.

Table 6.13. Lithic material of Cody Complex diagnostics from the East-Central Region

Material	Amount	Percent (%)
Swan River Chert	51	50.1
Knife River Flint	29	28.7
Cherts	17	16.8
Unknown	3	3.0
Fused Shale	1	1.0
Total	101	100

Just over half the diagnostics from this region (50.1%) are made from Swan River chert. The second most common material is Knife River flint at a little over one quarter of the material (28.7%). The third material type, making up most of the remaining material from this region, is various types of cherts (16.8%). Only one diagnostic item was made from fused shale (1.0%) with the three unknown materials making up the rest (3.0%). The diagnostic index for this

region is 0.67 which classifies the land use pattern as indeterminate. Unfortunately it is not possible to tell if the land use pattern is regional or nonregional, but there does seem to be a focus on using local lithic material, in particular the widely available Swan River chert.

Other than this use of local lithic material the Cody Complex groups in this area appear to have had interactions with southern regions. The Knife River flint, and the singular occurrence of fused shale, show that there were connections with southern areas of Saskatchewan and perhaps even further. If the land use pattern was confirmed as local according to the diagnostic index then trade would be the most likely source of the exotics. However, it is entirely possible that this exotic lithic material was directly procured.

If the Cody Complex people followed a round (yearly or otherwise) similar to one suggested by Ingbar (1994) that involved stopping at the Knife River flint quarries they may have had Knife River flint material available when reaching this area of Saskatchewan. As they moved, they would replenish their tool kits with locally available materials. In southern Saskatchewan, this would be fused shale as well as various cherts and chalcedonies. In east-central Saskatchewan, the main material available would be Swan River chert and, therefore, the predominate use of this lithic is not unexpected.

6.6.4 West-Central Region

The West-Central Region had the second fewest recorded diagnostics of the four areas for a total of 117 (Table 6.14). Not that many more diagnostics were recorded in this area when compared to the East-Central Region but the diversity in material types is substantially greater. Swan River chert, Knife River flint and various cherts make up the top three categories, respectively, just like the East-Central Region. However, each material makes up a much lower overall percentage when compared to the East-Central Region.

These three most common materials make up a fewer than sixty percent (59%) of the total. The non-exotic lithic materials make up over three fifths of the lithic materials used with a diagnostic index rating of 0.64. This makes the land use pattern based on lithic material types indeterminate.

The exotic materials suggest some interesting interactions that the Cody Complex people from this area would have had other places. While predominantly local materials were used in this region of Saskatchewan, Knife River flint was still the second most common material used

to make diagnostic tools. This suggests strong interactions in a southeastward direction, in particular toward North Dakota and the Knife River flint quarry areas. The fused shale and possible silicified peat, for which there are known source locations in southern Saskatchewan, also strengthen the idea of southward interactions. The obsidian would also most likely be procured from areas far to the south.

Table 6.14. Lithc material of Cody Complex diagnostics from the West-Central Region

Material	Amount	Percent (%)
Swan River Chert	36	30.8
Knife River Flint	20	17.1
Cherts	13	11.1
Quartzite	12	10.3
Beaver River Sandstone	8	6.8
Minor Exotics	7	6.0
Silicified Materials	6	5.1
Silicified Peat	4	3.4
Fused Shale	4	3.4
Chalcedonies	4	3.4
Miscellaneous	2	1.7
Obsidian	1	0.1
Total	117	100

While trade for all the materials is possible, similarly to the East-Central Region, direct procurement is also highly likely. Much like the East-Central Region depletion events would reduce the amount of Knife River flint in the tool kit with locally available materials being procured to replace them. In southern Saskatchewan, these replacements would have been made with fused shale among other materials (e.g. quartzites). These new materials, as well as the Knife River flint, would continue to be exhausted through other events and would have to

eventually be replaced. Materials local to the West-Central Region such as Swan River chert would be used to restore the depleted tool kit. The extremely exotic materials such as obsidian would most likely be obtained by trade or the movement of one or a few individuals and not large scale movements.

One final material found in this region, Beaver River sandstone, and the interactions it suggests should be discussed. Unlike most of the other exotic materials, it is found in a northwestern direction, in northeastern Alberta, and not in a south or southeastern direction. The amount of diagnostic items made from this material is not huge (6.8%) but it is identified as the fifth most common material in the region.

Cody Complex material has been found in the Beaver River sandstone quarry region of Alberta (Saxberg and Reeves 2006:9). This means that the Cody Complex people of Saskatchewan could have had access to Beaver River sandstone. However, whether it was directly procured by the people who used it in Saskatchewan is harder to determine. The small amount would suggest trade or the movement of one or a few others transporting the material.

6.7 Discussion and Conclusions

Determining the Cody Complex land use strategy in Saskatchewan, based on the lithic material types used to make diagnostics, has several issues. Most of the sites and small areas of site concentration show a nonregional land use strategy (Table 6.15). However, at the regional level three of the four regions show an indeterminate land use strategy and one shows a nonregional land use strategy (Table 6.16). In no case does the Cody Complex assemblage at a site, site cluster, or regional level in Saskatchewan show a regional land use strategy.

The diagnostic index test is very similar to the procedure used for lithic test 1 by Knell and Hill (2012:58-61). For the sites and areas used in both studies a similar data set is used, although in this study more data were available for some of the sites. However, the results were usually similar in both studies. Sites that showed a nonregional land use pattern in the Knell and Hill (2012) study showed a nonregional land use pattern in this study.

Based on the work by Knell and Hill (2012:57 Figure 9), grassland sites should show a nonregional land use pattern which is suggested as being very prevalent on the Canadian Plains (Root et. al. 2013:138). All the sites and areas examined in this study are in the grassland area and most of them show the expected nonregional land use pattern. The two exceptions are in the

east-central region of the provinces. Both areas had a large percentage of Swan River chert which is considered local due to its high incidence in the area. However, in these areas it is very possible that much of the Swan River chert was procured elsewhere and then brought into the areas where they were found.

Table 6.15. The Diagnostic Index for Cody Complex sites and areas in Saskatchewan

Site or Area	Diagnostic Index	Land Use Pattern
Niska Site	0.0	Nonregional
Heron Eden Site	0.07	Nonregional
Napao Site	0.10	Nonregional
Dunn Site	0.02	Nonregional
Farr Site	0.0	Nonregional
McLeod Site	0.0	Nonregional
Quill Lakes Area	0.49	Indetermined
Bjorkdale Area	0.71	Indetermined
Radisson Area	0.18	Nonregional

Table 6.16. The Diagnostic Index for the Cody Complex in regional study areas.

Region	Diagnostic Index	Land Use Pattern
Southeast	0.19	nonregional
Southwest	0.44	indetermined
East-Central	0.67	indetermined
West-Central	0.64	indetermined

The application of this approach at the regional level could be considered less successful in Saskatchewan. Three of the four regions show an indeterminate land use pattern based on the

diagnostic index of the region. Knell (2013) took the approach used previously by Knell and Hill (2012) to determine land use pattern for sites and small areas and then applied it to a larger region. Knell (2013) was able to show that Scottsbluff occupations showed a regional land use pattern on the Hartville Uplift in southeast Wyoming. However, Alberta occupations in this area show an indeterminate approach to land use on the Hartville Uplift. This study attempted to apply a similar approach to the Cody Complex material in Saskatchewan.

There are several major differences in the Saskatchewan study compared to the one undertaken in Wyoming. The most notable difference is size. The four regions examined in Saskatchewan are significantly larger than is the region of the Hartville Uplift. Although these regions in Saskatchewan consist mostly of grassland, they do incorporate several different physiographical locations such as river valleys and upland areas (e.g. Cypress Hills area). However, due to the diffuse and surface-find nature of the data set in Saskatchewan, the larger study areas were required.

The large areas were chosen because studies based on surface finds often use areas of significant size (Lepper 1989). These large areas are required to get enough data points. Many areas of Saskatchewan, if the study region was not large enough, would have few or even no recovered Cody Complex projectile points or knives. The vicinity around Ponteix might be an area that could be similar in size to the Hartville Uplift area study and have the required large number of surface recovered Cody Complex points from a number of sites. However, this would probably be the only area in Saskatchewan like this. The Dunn, Farr and McLeod sites are all in close proximity but they are only three sites compared to the dozens from the Ponteix area.

There are several problems with the large areas chosen, but as mentioned, the paucity of material in smaller areas makes them necessary. The biggest issue involves determining if lithic materials are local or exotic. Materials in some of the areas may be considered local, but for a majority of the sites and find locations, the material is not found nearby; fused shale is a good example of this.

Fused shale can be found in numerous locations in southern Saskatchewan (Johnson 1998). Due to this it is considered a local material in both southern study regions. However, many of the singular finds and other Cody Complex sites are not located near these source locations. This issue is probably why three of the regions are classified as indeterminate in land

use pattern. However, even with these areas being classified as indeterminate, the Cody Complex people in Saskatchewan probably practised a nonregional land use pattern.

The other problem with these large study regions is the bias in find locations for Cody Complex material. Most of the recovered Cody Complex artefacts have been found by avocational archaeologists. Many of these avocational archaeologists did/do their collecting in a limited area. This leads to large areas of the province which have undergone minmial to no investigation. These large blank areas may have an affect on the interpretation of land use and interactions of the Cody Complex peoples. The area that suffers the most because of this is the southeast region. Most of the material is found in three sites from a small area leaving large parts of this region with no data on the Cody Complex.

Even with these issues, the recorded Cody Complex material in the province does say a significant amount about the interactions of the Cody Complex within Saskatchewan and other areas. In total, 583 Cody Complex diagnostic items were recorded from throughout the province (Table 6.1). Slightly under half (48.2%) of these were made from Knife River flint with the second most frequently used material being Swan River chert (15.3%). The next two most common materials are fused shale (11.0%) and various cherts (10.0%). The remaining ten groups of materials make up just slightly over fifteen percent of the total recovered diagnostics.

Besides the raw numbers, there is an interesting pattern in where these lithic materials are found throughout the province. The greatest amount of Knife River flint is found in the Southeast Region. This is the region closest to the Knife River flint quarry area. As the regions get farther away from the source area for Knife River flint, the percentage of tools made from it decreases. The second highest amount of Knife River flint is in the Southwest Region followed by the east-central and west-central regions respectively. The Knife River flint material appears to be replaced mostly by local materials in these latter regions.

In the Southwest Region the most common local material is fused shale. In the two central regions, the most common local material is Swan River chert. It appears that the Cody Complex people in Saskatchewan were replacing used up Knife River flint tools with the best locally available material. In the southwest, this material is fused shale and in the central parts of Saskatchewan the best available material is Swan River chert.

This lithic use pattern suggests that the Cody Complex people in Saskatchewan were making journeys into North Dakota. Part of these trips included procurement of Knife River

flint. Fully stocked, they would head north into Saskatchewan where broken and exhausted tools would be replaced with locally available materials. Eventually their movements would bring them back south once again into North Dakota where they could once again acquire Knife River flint.

The lithic material types associated with the Cody Complex in Saskatchewan also hint at some other interesting interactions. Small amounts of other exotic materials also suggest interactions, probably trade, with areas outside Saskatchewan. One such example is obsidian. The closest source of obsidian to most of Saskatchewan is Yellowstone National Park. The most fascinating of these minor, in amount, exotics is probably the Beaver River Sandstone.

Beaver River sandstone has only been identified in Cody Complex assemblages from western Saskatchewan. As mentioned previously, the presence of Cody Complex material in the Beaver River sandstone quarry area is documented. However, the presence of Beaver River sandstone in sites so far away from the source area is rare. The minor amount of Beaver River sandstone in Saskatchewan would suggest that it was not being procured directly by the Cody Complex peoples in Saskatchewan. The material was probably being traded into Saskatchewan or moved by one or few individuals at most.

From many parts of Saskatchewan the Beaver River sandstone quarry area is closer than the Knife River flint quarry area. However, Knife River flint is always the most common lithic material exploited by the Cody Complex peoples in Saskatchewan. Yet substantial sites containing Cody Complex components have been recorded in both quarry areas. One possible explanation for this difference in material frequency may be territorial ranges. The Cody Complex people, who exploited Knife River flint, used the southern half of Saskatchewan as part of their overall range. Whereas, the Cody Complex people who exploited Beaver River sandstone did not use the southern half of Saskatchewan as part of their range. This idea is based on the work on Folsom in the Southern Plains (Bement 1999:170). A review of the material types exploited in southern Alberta may help determine the ranges of Cody Complex groups on the Northern Plains of Canada.

The Cody Complex in Saskatchewan appears to be heavily focused on using Knife River flint material when possible. However, while in Saskatchewan these groups used local materials to supplement the tool kit. The use of these lithic materials in this way suggests that they were ranging far across the landscape of Saskatchewan and practicing a nonregional land use strategy.

Chapter 7 Conclusions

7.1 Introduction

The principal objective of this study was to investigate the Cody Complex in Saskatchewan, and based on lithic material exploitation, determine what information could be gained from such data. Although there have been studies of fluted points in Saskatchewan (e.g. Hall 2009) that recorded as many points as possible, no such information was available for the Cody Complex. Such studies have been done in Alberta (Dawe 2013) and Manitoba (Pettipas 2011). Through literature review and fieldwork this study has recorded the presence of 583 Cody Complex projectile points and Cody knives in Saskatchewan.

Two major research hypotheses were presented in the introductory chapter. The first hypothesis concerned whether Cody Complex projectile points and knives were made predominately of Knife River flint. Throughout Saskatchewan, Knife River flint is the most commonly used material to make Cody Complex diagnostic material, but there is a gradient in how dominant Knife River Flint is in different areas of Saskatchewan. In the southeast area of the province, Knife River flint makes up the greatest percentage of the artefacts. This percentage decreases in both north and westward direction where local materials begin to become more common, replacing the Knife River flint.

The second hypothesis is whether the lithic materials, particularly in an exotic versus local material comparison, would show a nonregional land use pattern. At the small scale level, i.e. individual sites and their local areas, lithic materials showed a predominantly nonregional land use pattern. At a larger level, the lithic material indicated, in most cases, an indeterminate land use pattern. However, the people who left behind Cody Complex artefacts probably practiced a nonregional land use pattern in Saskatchewan. Due to the size of the regional study areas many lithic materials were considered local. However, these materials would not be

considered local to many of the sites within these regional areas. This may have skewed the data and leads to the conclusion that large areas such as the ones used in the current research are probably too large for this type of study.

7.2 Problems and Recommendations

As with many studies, there are a couple of problems that were difficult or impossible to contend with. There are also several different areas in which further work could be undertaken to improve our understanding of the Cody Complex in Saskatchewan.

The first major issue is the focus on only projectile points and knives. However, this has been impossible to avoid due to the nature of Cody Complex finds in Saskatchewan. Most Cody Complex material in Saskatchewan is found as surface finds, often as just a few or even as single artefacts. As a result, non-diagnostic material cannot be reliably attributed to the Cody Complex and so could not be used for this study.

The second major issue is collection bias. The recovery of Cody Complex material has mostly been undertaken by the avocational archaeologists of Saskatchewan, many of whom collect over a limited and focused area. In these locations, recovery is often excellent; outside of these areas there can be a significant paucity of data. The southeast part of the province is a good example. Few Cody Complex sites have been recorded in this part of the province outside of the Ogema and Radville areas. These areas have been significantly surveyed by avocational (Radville) and professional (Ogema) archaeologists. If such study was applied to other parts of the southeast, perhaps more Cody Complex sites would be recorded leading to a better informed interpretation of the Cody Complex land use in this region of the province.

There are also several aspects of the Cody Complex in Saskatchewan on which more work could be conducted. One would be an in depth analysis of the non-diagnostic material recovered from excavated sites in Saskatchewan. Information, such as how many exotic versus local materials are used in the entire tool kit, would be useful for determining the interactions with other areas and land use practises in Saskatchewan of Cody Complex artefact makers.

Second, an analysis of reworking and rejuvenation of Cody Complex projectile points could be undertaken. Aspects such as difference in location and material type would be important. Such a study might show points made from exotic lithic materials undergoing more reworking. A correlation might be done on distance from bedrock sources versus the amount of

reworking. If this was the situation, projectile points made from Knife River Flint in the central areas of Saskatchewan might show more reworking then in the southern areas of the province.

Finally, a more in depth analysis of the paleo-environment that the Cody Complex material is found in could be undertaken. Even with the surface nature that much of the Cody Complex material is found in, it would still be possible to look at the paleo-environmental conditions of surrounding areas. Such information could be used to help further expand the knowledge on the land use strategy used by people of the Cody Complex in Saskatchewan.

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Appendix A

Site Catalogues

Northeast Study Area

Archie Campbell Collection			
Site	Type	Material	Comments
A1 (FeMw - 3)	Scottsbluff	Chert	Stem and Shoulder
A4 (NW 33-47-14 W2)	Scottsbluff	Swan River Chert	Complete
	Scottsbluff	Swan River Chert	Complete
G3 (NE 20-41-12 W2)	Eden	Swan River Chert	Blade Portion
K4 (SW 1-42-11 W2)	Scottsbluff	Swan River Chert	Stem and Shoulder
M14 (NE 20-41-12 W2)	Scottsbluff	Swan River Chert	Blade Portion
S6 (SE 15-43-12 W2)	Scottsbluff	Chert	Reworking
	Scottsbluff	Chert	Stem
S20 (NE 31-41-12 W2)	Scottsbluff	Swan River Chert	Complete
S21 (NE 8-42-11 W2)	Scottsbluff	Swan River Chert	Complete
S28 (SE 1-42-10 W2)	Cody Knife	Swan River Chert	Complete
W2 (SW 9-43-12 W2)	Scottsbluff	Knife River Flint	Midsection
CON	Scottsbluff	Swan River Chert?	Only in Pictures
	Scottsbluff	Swan River Chert?	Only in pictures

Greater Forks Region			
Site	Type	Material	Comments
Riou Site (FgMv-4)	Alberta	Knife River Flint	Near Arbourfield
Walter Site	Alberta	Knife River Flint	Near Pontrilas
	Alberta	Knife River Flint	Near Pontrilas
	Alberta	Knife River Flint	Near Pontrilas
Boxall Site	Alberta	Swan River Chert	Near Leacross
Unspecified	Alberta	Knife River Flint	Near Melfot
	Alberta	Knife River Flint	Near Melfot
	Alberta	Swan River Chert	Near Melfot
Unspecified	Alberta	Knife River Flint	Near Pathlow
Unspecified	Alberta	Knife River Flint	Near Birch Hills
Unspecified	Alberta	Knife River Flint	
Harvey Site	Eden	Knife River Flint	Near Birch Hills
Odegard Site	Cody Knife	Knife River Flint	
Berkech Site (FhNh - 139)	Stem	Knife River Flint	
	Cody Knife	Knife River Flint	
	Scottsbluff	Knife River Flint	

	Scottsbluff	Swan River Chert	
Smytaniuk #1 (FhNi-86)	Scottsbluff	Swan River Chert	Blade of projectile point
Smytaniuk #2 (FhNi-85)	Cody Knife	Swan River Chert	
Bacher Site (FiNj-5)	Scottsbluff	Swan River Chert	
FgNe-3	Scottsbluff	Swan River Chert	
	Stem	Swan River Chert	
	Stem	Swan River Chert	
	Stem	Swan River Chert	
	Stem	Swan River Chert	
	Stem	Swan River Chert	
	Stem	Swan River Chert	
Rodea Site (FgNf-9)	Scottsbluff	Swan River Chert	
Ratner #2	Scottsbluff	Fused Shale	
Fennell	Scottsbluff	Swan River Chert	Near Melfort
Carlson	Scottsbluff	Knife River Flint	
FfNf-1	Scottsbluff	Swan River Chert	
Pathlow Area	Stem	Knife River Flint	
Edam	Scottsbluff	Knife River Flint	

	Stem	Swan River Chert	
	Blade	Knife River Flint	Projectile point blade fragment probably Scottsbluff
	Blade	Swan River Chert	Projectile point blade fragment probably Scottsbluff
	Blade	Swan River Chert	Projectile point blade fragment probably Scottsbluff
	Blade	Swan River Chert	Projectile point blade fragment probably Scottsbluff
Vigross #2	Cody Knife	Knife River Flint	
Atkins	Scottsbluff	Swan River Chert	
Preston	Scottsbluff	Swan River Chert	

Good Spirit Lake Point									
Catalogue Number	Full Length	Blade Length	Blade Width at Shoulders	Maximum Thickness	Stem Length	Stem Width	Type	Material	Comments
651	52.3	39	23.2	7.1	13.3	19	Scottsbluff	Beaver River Sandstone	From Good Spirit Lake - Burgis, Sask

The Klein Site (24-46-19 W2)			
Catalogue Number	Type	Material	Comments
4	Scottsbluff	Chert	Broken half way up blade
5	Scottsbluff	Chert	Heavy asymmetrical reworking
6	Scottsbluff	Chert	Heavy Damage to blade area

Orly Felton - Melfort Area								
Catalogue Number	Full Length	Blade Length	Blade Width at Shoulders	Maximum Thickness	Stem Length	Stem Width	Type	Material
FfNd - ? (Near Melfort)	67.3	51	22.9	7.1	16.7	20.7	Scottsbluff	Swan River Chert
FfNd - ? (Near Melfort)	42.8	24.1	31.1	7.3	18.7	25.1	Scottsbluff	Knife River Flint

Quill Lakes Region			
Site	Catalogue Number	Type	Material
ElMw-7	739	Scottsbluff	Chert
ElMw-7	940	Scottsbluff	Knife River Flint
ElMw-7	628	Scottsbluff	Chert
ElMw-7	291	Scottsbluff	Swan River Chert
ElMw-7	290	Scottsbluff	Knife River Flint
ElMw-7	288	Scottsbluff	Swan River Chert
ElMw-7	200	Scottsbluff	Chert
ElMw-7	199	Scottsbluff	Chert
ElMw-7	198	Scottsbluff	Swan River Chert
ElMw-7	139	Scottsbluff	Swan River Chert
ElMw-7	8	Scottsbluff	Swan River Chert
ElMw-7	1035	Scottsbluff	Swan River Chert
ElMw-7	7	Scottsbluff	Swan River Chert
ElMw-7	1030	Scottsbluff	Swan River Chert
ElMw-7	1033	Scottsbluff	Swan River Chert
ElMw-7	1036	Scottsbluff	Swan River Chert

ElMw-7	1034	Scottsbluff	Swan River Chert
ElMw-7	1032	Scottsbluff	Swan River Chert
ElMw-6	158	Scottsbluff	Chert
ElMw-6	154	Scottsbluff	Swan River Chert
ElMw-6	153	Scottsbluff	Knife River Flint
ElMw-6	157	Scottsbluff	Swan River Chert
Unspecified	58	Scottsbluff	Knife River Flint
Unspecified	59	Scottsbluff	Swan River Chert
Corley's and Kells Area	N/A	Scottsbluff	Swan River Chert
Corley's and Kells Area	N/A	Scottsbluff	Knife River Flint
ElNe-2	N/A	Scottsbluff	Knife River Flint
ElNd-15	N/A	Scottsbluff	Swan River Chert
ElNd-9	N/A	Scottsbluff	Chert
Wynyard Area	N/A	Scottsbluff	Unknown
ElMw-6	155	Eden	Chert
ElMw-6	148	Eden	Chert
ElMw-6	156	Eden	Chert
ElMw-4	111	Eden	Chert

ElMw-7	1031	Cody Knife	Chert
Unspecified	162	Cody Knife	Unknown
EkMw-7	1	Cody Knife	Swan River Chert
Unspecified	155	Drill	Knife River Flint

SE 29-42-13 W2			
Catalogue Number	Type	Material	Comments
unlabeled	Scottsbluff	Unkown	Found Southeast of Tisdale

8-22-13 W2			
Catalogue Number	Type	Material	Comments
unlabeled	Scottsbluff	Knife River Flint	Far North of Porcupine Plain

35-22-14 W2									
Catalogue Number	Full Length	Blade Length	Blade Width at Shoulders	Maximum Thickness	Stem Length	Stem Width	Type	Material	Comments
1	83	69	24	7	14	17	Scottsbluff	Knife River Flint	Complete

8-22-13 W2									
Catalogue Number	Full Length	Blade Length	Blade Width at Shoulders	Maximum Thickness	Stem Length	Stem Width	Type	Material	Comments
1	59	43	26	6	16	17	Scottsbluff	Gray Chert	Complete

Northwest Study Area

Wayne Lerch Collection									
Catalogue Number/Site	Full Length	Blade Length	Blade Width at Shoulders	Maximum Thickness	Stem Length	Stem Width	Type	Material	Comments
1656	67.3	40.7	29.9	8.9	26.6	25.1	Alberta	Beaver River Sandstone	
1774 (EdNu - 27)	57.8	40.7	28.2	6.9	17.1	24.2	Scottsbluff	Beaver River Sandstone	
1101 (EfNu - 12)	42.4		30.3	6.1	11.9	17.1	Scottsbluff	Knife River Flint	Blade Broken
59 (FdNu - 7)	47.9		28.5	7.4		23.2	Alberta	Beaver River Sandstone	Blade Broken; Stem mostly broken
210 (FdNj - 18)	52.9	43	25.9	6.5	9.9	20.4	Scottsbluff	Beaver River Sandstone	
1713 (FdNu - 40)	56.2	40.8	27.1	9.7	15.4		Scottsbluff	Swan River Chert	Reworked into a knife; stem heavily modified
886 (FdNf - 31)	47.2	28.4	24.8	9.2	18.8		Scottsbluff	Basalt	Heavy reworking
1273 (FdNo - 23)	33.6	22.1	22.6	6.1	11.5	8.9	Scottsbluff	Chalcedony	Blade Reworked
885 (FdNf - 31)	22.8		17.5	6.2	17.5	21.9	Scottsbluff	Beaver River Sandstone	Blade Broken; Heavy reworking on one blade edge
12 (FdNu - 8)	32.9	22	22.7	5.3	10.9	17.7	Scottsbluff	Swan River Chert	Stem Broken

283 (FdNv - 5)	36.9	28.2	22.5	6.1	8.7	16.1	Scottsbluff	Chert	Tip Broken
593 (FdNv - 5)	35.6	26	21.6	5.3	9.6	15.3	Scottsbluff	Chert	
242 (FdNt -10)	30	17.2	25.1	6.7	12.8	19.6	Cody Knife	Quartzite	Small little to no reworking
174 (FdNt - 25)	32.2			3.7	15.8	15.1	Drill	Knife River Flint	Possible point reworked into drill
1760 (FdNt - 44)	23			6.4	13.2	14.3	Drill	Obsidian	Broken; point possible reworked into drill
NE 6 - 41 -9 - W3 #1							Eden	Chert	Just a stem
NE 6 - 41 -9 - W3 #2							Eden	Chert	Just a stem

Muriel Carlson Report			
Site	Type	Material	Comments
FcOl-1	Alberta	Knife River Flint	Complete
FeOb-8	Alberta	Knife River Flint	Complete
FeOb-9	Alberta	Knife River Flint	Complete
FeOf-1	Scottsbluff	Maroon Jasper	
FeOf-2	Scottsbluff	Silicified Peat	
	Stem	Knife River Flint	
	Stem	Swan River Chert	
	Scottsbluff	Swan River Chert	Heavily Reworked
FfOc-2	Scottsbluff	Swan River Chert	
	Scottsbluff	Swan River Chert	
FfOc-3	Alberta	Knife River Flint	
FfOc-4	Cody Knife	Silicified Peat	
	Stem	Chert - Grey	
FfOc-5	Scottsbluff	Yellow Jasper	Heavily Reworked
FfOc-6	Scottsbluff	Knife River Flint	
FfOd-6	Scottsbluff	Quartzite - Light Grey	

FfOd-9	Scottsbluff	Swan River Chert	Broken Stem/Heavily Reworked
FfOd-10	Eden	Swan River Chert	
	Scottsbluff	Silicified Peat	
FfOd-11	Eden	Silicified Siltstone	Burin spalls have been removed
FfOe-5	Eden	Swan River Chert	Blade Section
FgOc-7	Scottsbluff	Quartzite - Brown Grey	Heavily Reworked
FdOd-2	Scottsbluff	Knife River Flint	Heavily Reworked
FgOd-3	Scottsbluff	Quartzite - Red	
FgOd-5	Alberta	Quartzite	Stem Missing
FgOd-6	Scottsbluff	Swan River Chert	Stem broken; Major Reworking
FgOe-10	Scottsbluff	Swan River Chert	Blade Section
FgOe-11	Scottsbluff	Swan River Chert	
FgOe-12	Eden	Swan River Chert	
FgOe-13	Scottsbluff	Swan River Chert	
FgOe-14	Scottsbluff	Quartzite	Tiny
	Scottsbluff	Swan River Chert	
	Stem	Swan River Chert	
	Stem	Quartzite	

FgOe-16	Scottsbluff	Gronlid Siltstone	
FgOe-19	Alberta	Knife River Flint	Blade Portion
FgOe-20	Alberta	Chalcedony	
FgOf-8	Scottsbluff	Knife River Flint	
FgOf-9	Eden	Chalcedony	Two pieces
FgOf-10	Cody Knife	Quartzite	
FgOf-11	Scottsbluff	Beaver River Sandstone*	
FgOf-12	Scottsbluff	Beaver River Sandstone*	
FgOg-4	Scottsbluff	Jasper	
FgOg-5	Scottsbluff	Swan River Chert	Blade broken
	Scottsbluff	Knife River Flint	
FgOg-7	Scottsbluff	Beaver River Sandstone*	Tip Broken
	Cody Knife	Silicified Peat	
FgOg-9	Cody Knife	Knife River Flint	Stem Mostly Broken
FgOg-10	Scottsbluff	Knife River Flint	Stem Mostly Broken
FgOg-11	Alberta	Knife River Flint	
FgOh-7	Alberta	Fused Shale	Stem and Shoulders
	Cody Knife	Knife River Flint	

	Scottsbluff	Chert - Grey	
	Scottsbluff	Chert	
FgOh-8	Scottsbluff	Fused Shale	Heavily Reworked
FhOd-2	Eden	Chalcedony	Stem
	Stem	Swan River Chert	Considered Alberta
	Stem	Swan River Chert	
	Scottsbluff	Quartzite	Heavily Reworked
	Stem	Swan River Chert	
	Scottsbluff	Chert - Yellow	Used as a knife
	Scottsbluff	Quartz	Blade and One Shoulder Broken
	Scottsbluff	Swan River Chert	Steam and Blade Broken in places
	Stem	Swan River Chert	
FhOd-9	Cody Knife	Swan River Chert	
FhOe-7	Scottsbluff	Swan River Chert	Blade mostly gone
FhOe-8	Alberta	Swan River Chert	Large; Tip Missing
	Scottsbluff	Swan River Chert	Top half of blade broken
	Scottsbluff	Swan River Chert	Tip Broken
	Scottsbluff	Swan River Chert	

	Alberta	Swan River Chert	Blade mostly gone
	Scottsbluff	Banded Agate	Heavily Reworked
	Stem	Swan River Chert	
FhOf-3	Scottsbluff	Jasper	Reworked; Used as scraping tool
FhOf-4	Scottsbluff	Swan River Chert	Tiny
FhOf-6	Scottsbluff	Fused Shale	Complete
	Cody Knife	Fused Shale	
FhOf-7	Stem	Quartzite	Reworked into drill
	Scottsbluff	Red Jasper	Broken below shoulder
	Eden	Swan River Chert	Stem
	Stem	Jasper	Broken below shoulder
FhOf-12	Scottsbluff	Knife River Flint	Complete
	Scottsbluff	Quartzite	
FhOg-4	Cody Knife	Knife River Flint	Complete
	Eden	Swan River Chert	Blade Section
FhOi-6	Eden	Swan River Chert	Blade Section
FhOj-9	Scottsbluff	Swan River Chert	Used as a knife
	Scottsbluff	Chert	

	Alberta	Swan River Chert	Blade broken
FiOa-1	Scottsbluff	Silicified Siltstone	Heavily Reworked
FiOc-5	Scottsbluff	Swan River Chert	Used as a knife
FiOi-4	Scottsbluff	Silicified Siltstone	Tip blunted; Reworked
FiOj-25	Scottsbluff	Swan River Chert	Used as a knife
FiOk-1	Alberta	Knife River Flint	Large and Complete
FiOl-16	Eden	Silicified Siltstone	Tip of blade
FjOe-1	Scottsbluff	Quartzite	Small; Heavily Reworked
FjOe-6	Alberta	Chert	Stem broken below shoulder
FjOi-13	Eden	Silicified Siltstone	Blade Tip

FfNq - ?								
Catalogue Number	Full Length	Blade Length	Blade Width at Shoulders	Maximum Thickness	Stem Length	Stem Width	Type	Material
unlabeled	66.5	51.5	30.5	8	15	25.5	Scottsbluff	Chert

FeOb - ?								
Catalogue Number	Full Length	Blade Length	Blade Width at Shoulders	Maximum Thickness	Stem Length	Stem Width	Type	Material
unlabeled	72	49.5	31.5	7.5	23.5	24.5	Alberta	Knife River Flint

Southeast Study Area

Dunn Site (DjNf-1)									
Catalogue Number	Full Length	Blade Length	Blade Width at Shoulders	Maximum Thickness	Stem Length	Stem Width	Type	Material	Comments
1	40.45	25.85	21.4	5.5	14.6	19.8	Firstview	Knife River Flint	
2	50		20.5	6.8	14.7		Firstview	Knife River Flint	blade broken
3	24.2		17.5	4.5			Firstview	Knife River Flint	
4	34		23.3	6.5	15	19.1	Firstview	Knife River Flint	
5, 61, 161	109	16.2	21.15	6.9	16.5		Firstview	Knife River Flint	found in three pieces
6	16.2					19.9	Stem	Knife River Flint	stem only
7, 46	52.2		24.4	7.2			Firstview	Knife River Flint	Two pieces
8	31.8		17.65	6.5			Firstview	Knife River Flint	
9	16.5		19.2	5.85			Firstview	Knife River Flint	
10	53.45		20	6.95			Firstview	Knife River Flint	
11	49.3		16	5.3			Firstview	Knife River Flint	
12	10.5					23.9	Stem	Knife River Flint	
13, 49	69.5	49.7	24.9	7.4	19.8	22	Firstview	Knife River Flint	Two refitted pieces
21, 132	60		23	6.7	16.1	21.1	Firstview	Knife River Flint	Two refitted pieces
22							Firstview	Knife River Flint	Fragment

23	122	106.5	22.9	7.65	15.5	20	Firstview	Knife River Flint	
24	59.5		21.15	5.9			Firstview	Knife River Flint	
25							Firstview	Knife River Flint	Fragment
26							Firstview	Knife River Flint	Fragment
29, 34	48.35		19.01	7.35	18	8	Firstview	Knife River Flint	blade broken
30, 134	92.8	85.9	21.3	7.9			Firstview	Knife River Flint	Stem Missing
31							Firstview	Quartzite	Fragment
33	32.15		21.3	6.15	15.85	20.35	Firstview	Knife River Flint	blade broken
36	25		19.1	5.7			Firstview	Knife River Flint	blade broken
37	80		19.65	8.25	17	18.5	Firstview	Knife River Flint	blade broken
38	26.2			7			Firstview	Knife River Flint	
39	44.6		36.9	8.3	14.8	16.3	Firstview	Knife River Flint	
41							Firstview	Jasper	Fragment
42							Firstview	Knife River Flint	Fragment
43	21.2		21	5.4			Firstview	Jasper	
44	51.15	0	24	7.6	14.8		Firstview	Knife River Flint	
47	30			7.1			Firstview	Knife River Flint?	
48	34.8	30	14.75	4.1	11.6	12.8	Firstview	Knife River Flint	

51	51.7		23	5.85			Firstview	Knife River Flint	
52	57.1		21.3	8.1			Firstview	Knife River Flint	
55	51.1		22.85	6.45	17.5		Firstview	Knife River Flint	
56	41.1		17.85	4.85			Firstview	Knife River Flint	
59	27.7		19.65	7			Firstview	Knife River Flint	
64							Firstview	Knife River Flint	Fragment
65	37.3		25	5.75			Firstview	Knife River Flint	
67							Firstview	Knife River Flint	Fragment
68							Firstview	Knife River Flint	Fragment
69							Firstview	Knife River Flint	Fragment
70	24.3		21.1	6.5			Firstview	Knife River Flint	
72	50.4	37.3	22.2	7.25			Firstview	Knife River Flint	
73, 112	62.4		19.45	6.1			Firstview	Knife River Flint	
1							Firstview	Knife River Flint?	Fragment
79	19.7		6.85	5.8			Firstview	Knife River Flint	
81, 174	35.51		1.98	5.9			Firstview	Knife River Flint	
85	32.95		14.3	6.2			Firstview	Knife River Flint	
86	22.4		19.5	6.1			Firstview	Knife River Flint	

87	77	71.35	20.55	6.75			Firstview	Knife River Flint	
91	25.6		23.2	6.3			Firstview	Knife River Flint?	
93	104.9	87.65	23.75	7.5	17.25	20.4	Firstview	Knife River Flint	
95	44		21.7	6.1			Firstview	Knife River Flint	
96	29		22.65				Firstview	Knife River Flint	
97	42		17.8	6.05			Firstview	Knife River Flint	
101*	66.6	72.15	23.2	4.85	13.7	17.25	Firstview	Knife River Flint	
102*	89	62	18.7	7.2	16.85	17.5	Firstview	Knife River Flint	
103*	77.8		21.3	8.25	15.8	18.2	Firstview	Knife River Flint	
105*	54.4		19.8	6.45	16.7	17.1	Firstview	Knife River Flint	
106*	49		18.85	5.75	13.5		Firstview	Knife River Flint	
107*	27.65		19.6	5.7	19.4	14.4	Firstview	Knife River Flint	
108*	44.55		19.7	6.65			Firstview	Knife River Flint	
109*	45.3		21.6	6.2			Firstview	Knife River Flint	
110*	42.4		23.35	6.4			Firstview	Knife River Flint	
113*	40.8		22.25	6.7			Firstview	Knife River Flint	
114*	7.4			5.7			Firstview	Knife River Flint	
115*	39.5		17.7	5.5			Firstview	Knife River Flint	

116*	18						Firstview	Knife River Flint	Fragment
117*	31.6		20.4	6.7			Firstview	Knife River Flint	
118*	39		19.1	6.6			Firstview	Knife River Flint?	
119*	39.15		18.5	6			Firstview	Knife River Flint	
120*	18.4		18.01	4.4			Firstview	Knife River Flint	
126	27		18.3	7.1			Firstview	Chert	
127	107.5	93.1	22.2	7.2	14.4	20	Firstview	Knife River Flint	
128	51	32.5	20.6	6.55	18.5/19.15	18.4	Firstview	Knife River Flint	
129	54.4		24.7	5.9			Firstview	Porcelanite	
130	21.2		19.7	6.4			Firstview	Knife River Flint	
133							Firstview	Knife River Flint?	
136, 162	56.5	44.4	18	6	12.1	15.5	Firstview	Knife River Flint	
139	37		20.5	5.1			Firstview	Knife River Flint	
156							Firstview ?	Knife River Flint	
157	24.7		20.7	4.8			Firstview ?	Knife River Flint	
163							Firstview	Knife River Flint	
164	33.3		22	5.2	16	18.8	Firstview	Knife River Flint	
165	24			7			Firstview	Knife River Flint	

166							Firstview	Knife River Flint	
170	39.8		19.8	6.5			Firstview	Knife River Flint	
177			29				Scottsbluff	Knife River Flint	
180						21	Firstview	Knife River Flint	

Farr Site (DjNf-8)								
Catalogue Number	Full Length	Blade Length	Blade Width at Shoulders	Maximum Thickness	Stem Length	Stem Width	Type	Material
1 (T)	40		15.6	5.25			Cody	grey chert
2 (T)	25.4		23.9	7.4			Cody?	White chert
15 (T)	43.15		21.2	8.7			Cody	Pink chert
23 (T)	48.95		14.45	6.35			Eden	Knife River Flint
24 (T)	19.7		17.1	6.3			Cody	chert
34 (T)	21.7		13	4.8			Cody	brown/yellow agate
36 (T)							Cody	Knife River Flint
66 (T)	26.3	13.3	16.2	5.3	8.2	13.3	Cody	Brown agate
74 (T)	23.8	?	18.2	6	7.1	?	Cody	grey chert
77 (T)	27		18.6	7.7			Cody	Brown chert
85 (T)	84	70.8	15.5	6.5	13.3	14.8	Eden	Knife River Flint
88 (T)	87.2	75.2	18.5	7	12	15.6	Firstview	Knife River Flint
1	37.25	27.15	20.2	5.7	10.1	16.16	Scottsbluff	Agate
2	31		23.5	7.7			Scottsbluff	White chert
3	24.5		15.1	6.3			Eden	Red jasper

4	24.5	12.9	18.3	7.1	11.6	17.9	Scottsbluff	White chert
6	19		34.4	8		33.15	Cody?	Pink SWC
7	8.95			4.3		17.8	Cody?	Grey Porcelanite
8	32.6	21.4	17.75	5.9	11.2	14.2	Cody	Yellow agate
9			21.4	5.5			Cody?	Knife River Flint
13	23.2		21.6	6.6	12.1		Scottsbluff	Red & Brown agate
20	20		16.5	6.5			Cody	Knife River Flint
28	32.35	20.35	20.8	6.85	12	?	Cody	Red & white SWC
31	31.7	31	16.5	5.75			Scottsbluff	White chert
33	31.8		19.45	8.5	14.1	16.4	Eden	Grey Chert
34	6.5		19.8	6.1		20	Cody	Knife River Flint
39	26		17.8	6.9	14	17.5	Eden	Yellow agate
40	25.7		22.1	5.9	12.4	?	Scottsbluff	?
41	52.7	43	22.2	9	9.7	17.5	Scottsbluff	Grey Porcelanite
44	31.9		19.9	7.2			Cody	Knife River Flint
45	35.4		22.4	7.5			Cody	Petrified wood
58	29.8		23.3	6.2	?		Cody	White Chert
70	47.5		19.2	7.4	13.4		Firstview	Petrified wood

76	25		20	7			Cody	Pink/orange chert
77	29.1		15.8	5.5	9.5		Eden	Petrified wood
78	62	51	26	8.4	11	19.6	Scottsbluff	Knife River Flint
82	25.3		16.4	4.9	8	11	Cody	Clear chalcedony
83	18		12.4	6			Eden?	Porcelanite
84	42.8		16	7			Eden	Garnet colour chert
86	27.5		24.2	7.4			Scottsbluff	Grey & white chert
87	29	17.9	15.5	5	10.1		Eden	Brown Chert?
88	30	21.3	15.2	4.4	8.7	12	Scottsbluff	Knife River Flint
89	37.4		15.5	7			Eden	Yellow/orange chert
91	48.5	33.5	24.9	7	15		Scottsbluff	Petrified wood
94	16.5		19	5.6			Cody	Pink Chert
97	11.5		15.7	5		15	Cody	Knife River Flint
98	30.8		15	5.5	7	12.5	Scottsbluff	Knife River Flint
99	45		18.7	6.5	10.2		Firstview	Knife River Flint
108	16.9		13.8	6.8			Eden	Grey Quartzite

McLeod Site			
Site	Catalogue Number	Type	Material
McLeod (DiNb-6)	1	Scottsbluff	Knife River Flint
	2	Scottsbluff	Knife River Flint
	3	Scottsbluff	Fused Shale
	7	Scottsbluff	Fused Shale
	8	Scottsbluff	Fused Shale
	9	Scottsbluff	Knife River Flint
	12	Scottsbluff	Knife River Flint
	15	Scottsbluff	Knife River Flint
	16	Scottsbluff	Knife River Flint
	17	Scottsbluff	Knife River Flint
	18	Scottsbluff	Knife River Flint
	19	Scottsbluff	Chert
	20	Scottsbluff	Jasper
	21	Scottsbluff	Knife River Flint
	40	Scottsbluff	Knife River Flint
	46	Scottsbluff	Knife River Flint

	50	Scottsbluff	Fused Shale
	52	Scottsbluff	Knife River Flint
	54	Scottsbluff	Knife River Flint
	56	Scottsbluff	Jasper
	57	Scottsbluff	Knife River Flint
	58	Scottsbluff	Knife River Flint
	59	Scottsbluff	Fused Shale
	62	Scottsbluff	Knife River Flint
	64	Scottsbluff	Knife River Flint
	71	Scottsbluff	Knife River Flint
	77	Scottsbluff	Knife River Flint
	79	Scottsbluff	Chert
	78	Scottsbluff	Chert
	99	Scottsbluff	Knife River Flint
	4	Eden	Knife River Flint
	11	Eden	Knife River Flint
	13	Eden	Knife River Flint
	35	Eden	Knife River Flint

	44	Eden	Fused Shale
	48	Eden	Knife River Flint
	53	Eden	Knife River Flint
	60	Eden	Knife River Flint
	61	Eden	Knife River Flint
	169	Eden	Knife River Flint
	5	Cody	Knife River Flint
	6	Cody	Knife River Flint
	10	Cody	Knife River Flint
	22	Cody	Knife River Flint
	23	Cody	Knife River Flint
	24	Cody	Knife River Flint
	25	Cody	Knife River Flint
	26	Cody	Knife River Flint
	29	Cody	Fused Shale
	30	Cody	Knife River Flint
	32	Cody	Knife River Flint
	33	Cody	Knife River Flint

	34	Cody	Knife River Flint
	37	Cody	Knife River Flint
	38	Cody	Knife River Flint
	39	Cody	Knife River Flint
	41	Cody	Knife River Flint
	42	Cody	Knife River Flint
	43	Cody	Knife River Flint
	47	Cody	Knife River Flint
	49	Cody	Knife River Flint
	51	Cody	Knife River Flint
	55	Cody	Knife River Flint
	63	Cody	Knife River Flint
	65	Cody	Knife River Flint
	66	Cody	Knife River Flint
	67	Cody	Knife River Flint
	68	Cody	Knife River Flint
	69	Cody	Knife River Flint
	70	Cody	Knife River Flint

	73	Cody	Chert
	74	Cody	Knife River Flint
	75	Cody	Knife River Flint
	80	Cody	Metamorphic slate
	81	Cody	Chert
	119	Cody	Knife River Flint
	82	Alberta	Obsidian
	136	Cody Knife	Chalcedony
	137	Cody Knife	Knife River Flint
	138	Cody Knife	Jasper
	139	Cody Knife	Chalcedony
	140	Cody Knife	Knife River Flint

EdNg-7			
Site	Type	Material	Comments
EdNg-7/14	Scottsbluff	Fused Shale	Stem and Shoulder Fragment

EdNg-8			
Site	Type	Material	Comments
EdNh-8/1	Alberta	Knife River Flint	Split in half laterally
EdNh-8/2	Alberta	Knife River Flint	Blade portion

Southwest Study Area

Niska Site (DkNu-3)									
Catalogue Number	Full Length	Blade Length	Blade Width at Shoulders	Maximum Thickness	Stem Length	Stem Width	Type	Material	Comments
a604	82.8	63.9	25.2	6.5	18.9	24.3	Scottsbluff	Fused Shale	Stem made by slight flaking
204	48.9	36.8	21.5	5.2	12.1	15.4	Scottsbluff	Fused Shale	Tip broken
a980	57.5	39.9	23.2	7.2	17.6	14.1	Scottsbluff	Fused Shale	
a982	63	48.9	19.4	5.8	14.1	12.3	Scottsbluff	Agate	Tip broken
122	41.7	31.4	24.7	7.2	10.3	16.4	Scottsbluff	Fused Shale	
a401	36.9	26.2	17	5.1	10.7	12.6	Scottsbluff	Knife River Flint	Heavy reworking
143	32.6	19.6	19	5.4	13	16.4	Scottsbluff	Fused Shale	Asymmetrical reworking
a400	32.1	18.8	14.4	5.3	13.3	14.8	Scottsbluff?	Knife River Flint	Reworked heavily, shoulders gone
305	40.3	27.9	20.2	5.5	12.4	16.7	Scottsbluff	Fused Shale	Asymmetrical reworking
433	60	46	23.5	6.3	14	15.6	Scottsbluff	Knife River Flint	
309	54.5	40.9	20.7	5.3	13.6	14.9	Scottsbluff	Knife River Flint	Tip and part of stem broken; asymmetrical reworking

355	58.6	46.1	13.9	5.6	12.5	11.9	Eden	Knife River Flint	
121	59.8	34.5	28.6	8.5	25.3	19.9	Alberta	Knife River Flint	
unlabeled	37.1		28.3	6.5	13.1	18.7	Scottsbluff	Fused Shale	Blade broken
unlabeled	34.8		21.4	5.7	15.6	16.1	Scottsbluff	Fused Shale	Blade broken
120	48.8	31.7	18.8	5.5	17.1	16.5	Cody Knife	Knife River Flint	
120	38.4		35	5.7	16.3	19.9	Cody Knife	Knife River Flint	Blade broken
120	29.1		27.8	4.8	10.6	17.9	Cody Knife	Knife River Flint	Blade broken
442	50.6		26.5	5.2	12.7	17.7	Cody Knife	Knife River Flint	Blade broken
257	39.5		36.3	6.2	16.4	24.9	Cody Knife	Fused Shale	Blade broken
302	58.8	43.9	34.4	6.2	14.9	20.2	Cody Knife	Fused Shale	Tip broken
76	35.7	24.7	19.2	4.7	11	14.9	Cody Knife	Knife River Flint	Tip broken
unlabeled								Fused Shale	Stem Fragment
unlabeled								Fused Shale	Stem Fragment
unlabeled								Fused Shale	Stem Fragment

300								Fused Shale	Stem Fragment
306								Fused Shale	Stem Fragment
373								Fused Shale	Stem Fragment
unlabeled							Cody Knife?	Knife River Flint	Blade Fragment
unlabeled								Chalcedony	Blade Fragment
unlabeled								Silicified?	Blade Fragment
a605								Jasper	Stemmed Flake?
307							Cody Knife?	Knife River Flint	Blade Fragment

Napao Site (DkNv-2)									
Catalogue Number	Full Length	Blade Length	Blade Width at Shoulders	Maximum Thickness	Stem Length	Stem Width	Type	Material	Comments
229	124.4	100.2	33.6	9.9	24.2	24.3	Scottsbluff	Fused Shale	
252	107.3	82.3	40	6.6	25	25.3	Cody Knife	Knife River Flint	Two pieces refitted
330	86.6	73	20.7	5.6	13.6	14.7	Scottsbluff	Fused Shale	
362	70.3	64.1	26.6	7.2	6.2	20.2	Alberta	Fused Shale	Tip broken
466	67.8	45.7	27.8	9.3	22.1	22.5	Scottsbluff	Knife River Flint	Tip broken
a700	49.6	35	23.5	7.1	14.6	14.1	Alberta	Fused Shale	
361	56.7	38.8	29.5	8.9	17.9	24.7	Alberta	Fused Shale	Asymmetrical reworking
a715	55	34.9	31.8	8.3	20.1	21.5	Scottsbluff	Knife River Flint	
333	38.8		24.7	6.6	12.3	18.7	Scottsbluff	Chert	Blade broken; asymmetrical reworking
a879	92.6	75.8	33.9	7.5	16.8	22.2	Alberta	Knife River Flint	Two pieces refitted
311	37	24.4	14.2	5.1	12.6	11.1	Scottsbluff	Fused Shale	Tip broken

341	47.3	26	18.1	5.4	21.3	16.6	Scottsbluff	Knife River Flint	Reworked into drill; asymmetrical reworking
377							Stem	Knife River Flint	Possible Alberta
381							Stem	Knife River Flint	
320							Stem	Fused Shale	
376							Stem	Knife River Flint	
374	43.7	40.6	30.2	5.3		20.1	Blade	Fused Shale	Broken just below the shoulder
361							Blade	Knife River Flint	Possible Eden
480							Blade	Obsidian	Broken around shoulder and tip
337	43.1		29.8	11.2	28.9		Scottsbluff	Feldspathic	Broken part way down stem and down blade
312							Blade	Fused Shale	Possible Scottsbluff

Heron Eden Site (EeQi-11)									
Catalogue Number	Full Length	Blade Length	Blade Width at Shoulders	Maximum Thickness	Stem Length	Stem Width	Stem Thickness	Type	Material
1	80.7	62.3	20.6	7.7	17.8	19.8		Scottsbluff	Silicified Wood
2	80.3	64.2	16.5	6.5	16.4	15.1		Eden	Knife River Flint
3	77.7	60.8	21.8	7.3	16.3	20.5		Scottsbluff	Beaver River Sandstone
4	70.6	52.6	21.2	8.2	16.5	19.1		Scottsbluff	Beaver River Sandstone
5	57.2	39.8	21.1	7.3	16.9	19.5		Scottsbluff	Montana Agate
6	56.1	39.6	22	6.3	15.4	19.2		Scottsbluff	Knife River Flint
7	44.1	31.7	19.6	5.6	12.2	17.2		Scottsbluff	Knife River Flint
8	38.5	24.2	20.8	7.2	13.5	17.9		Scottsbluff	Montana Agate

Bambino Site (DkNu-37)									
Catalogue Number	Full Length	Blade Length	Blade Width at Shoulders	Maximum Thickness	Stem Length	Stem Width	Type	Material	Comments
322	61.3	37.6	26.7	7.1	23.7	21	Alberta	Fused Shale	
137	44	34.4	21.4	6	9.6	20	Scottsbluff	Fused Shale	Reworked on both ends
447	47.9	29.5	30.7	6	18.4	24.9	Cody Knife	Knife River Flint	
471			30.5	6.4	17.6	19	Alberta	Knife River Flint	Broken above shoulder
unlabeled	33.7	19.9	22.5	6.5	13.8	15.8	Alberta	Fused Shale	Entire points shows reworking
unlabeled	52.7		26.8	7	17.4	18.6	Alberta	Fused Shale	Broken part way up blade
unlabeled							Blade	Fused Shale	Tip of blade
unlabeled							Blade	Knife River Flint	Top of blade
unlabeled							Blade	Knife River Flint	Top of blade

Bosco Site (DkNu-12)									NW - 3 - 9 -12 - W3
Catalogue Number	Full Length	Blade Length	Blade Width at Shoulders	Maximum Thickness	Stem Length	Stem Width	Type	Material	Comments
94	45.4	31.1	34	5.7	14.3	19.9	Cody Knife	Fused Shale	Multi-layered material

DjNv - 2									NE - 23 - 8 -12 - W3
Catalogue Number	Full Length	Blade Length	Blade Width at Shoulders	Maximum Thickness	Stem Length	Stem Width	Type	Material	Comments
211	55	43.9	21	6	11.1	14.8	Scottsbluff	Knife River Flint	Tip Broken
a714	103.6	89.3	26.8	8.1	14.3	20.7	Scottsbluff	Knife River Flint	Plough damage along point
unlabeled	68.9		31.3	8.1	10.3		Scottsbluff	Fused Shale	Tip hinge fractured; one half stem broken

DkNu - 4									SW - 23 -9 -11 - W3
Catalogue Number	Full Length	Blade Length	Blade Width at Shoulders	Maximum Thickness	Stem Length	Stem Width	Type	Material	Comments
a60	33.8	19	23.8	7.6	14.8	17.2	Alberta	Fused Shale	Impact fracture at tip

DkNu-8								
Catalogue Number	Full Length	Blade Length	Blade Width at Shoulders	Maximum Thickness	Stem Length	Stem Width	Type	Material
a96	62.9	59.9	25.3	5.4	13	17.1	Cody Knife	Knife River Flint
unlabeled							Stem	Silicified Wood

DkNu-15									SW - 7 - 9 - 11 - W3
Catalogue Number	Full Length	Blade Length	Blade Width at Shoulders	Maximum Thickness	Stem Length	Stem Width	Type	Material	Comments
a378	67.1	57	28.6	7.2	10.1	18.7	Scottsbluff	Knife River Flint	Stem Broken modern damage
99	65.5	49.9	21.4	5.7	15.6	18.4	Scottsbluff	Knife River Flint	Two pieces refitted
a492	64.7	45.1	32.7	9.2	19.6	20.3	Alberta	Fused Shale	Modern damage on blade; roughly flaked
a441	49.5	36.8	23	6.8	12.7	16.7	Scottsbluff	Knife River Flint	Very tip broken
193	43.9		31.2	8.6			Alberta	Fused Shale	Broken just below shoulder
unlabeled							Scottsbluff	Knife River Flint	Broken laterally; caused by fire?

DkNv - 7									SW - 3 - 9 - 12 - W3
Catalogue Number	Full Length	Blade Length	Blade Width at Shoulders	Maximum Thickness	Stem Length	Stem Width	Type	Material	Comments
b434/b456							Stem	Knife River Flint	Eden?

DkNv - 12									SW - 1 - 9 - 12 - W3
Catalogue Number	Full Length	Blade Length	Blade Width at Shoulders	Maximum Thickness	Stem Length	Stem Width	Type	Material	Comments
100	79.1	67.9	16.4	6.3	11.2	14.4	Eden	Knife River Flint	Two pieces refitted

DkNv - 14									SW - 25 - 8 -12 -W3
Catalogue Number	Full Length	Blade Length	Blade Width at Shoulders	Maximum Thickness	Stem Length	Stem Width	Type	Material	Comments
unlabeled					16.7	19.7	Stem	Fused Shale	Probable Scottsbluff; Broken just above shoulder
unlabeled	36.6		21.5	6.1	11.9	14	Alberta	Fused Shale	Broken three quarters up blade

DkNv - 18									NE - 33 - 8 - 12 - W3
Catalogue Number	Full Length	Blade Length	Blade Width at Shoulders	Maximum Thickness	Stem Length	Stem Width	Type	Material	Comments
a74	53.3	29.1	31.7	7.5	24.2	13.9	Cody Knife	Knife River Flint	

Pambrun Area - Hiebert									
Catalogue Number	Full Length	Blade Length	Blade Width at Shoulders	Maximum Thickness	Stem Length	Stem Width	Type	Material	Comments
MH859	78.9	58	28.7	7.1	20.9	20.8	Alberta	Silicified peat	From Pambrun area

Unnamed									NE - 24 - 8 -12 - W3
Catalogue Number	Full Length	Blade Length	Blade Width at Shoulders	Maximum Thickness	Stem Length	Stem Width	Type	Material	Comments
unlabeled	53.8	35.2	28.4	7.7	18.6	14.3	Scottsbluff	Fused Shale	Blade broken part way up
unlabeled							Scottsbluff	Fused Shale	Not accessible for measurements

Ponteix Paleo-Indian				
Catalogue Number		Type	Material	Comments
unlabeled		Cody Knife	Knife River Flint	
unlabeled		Cody Knife	Knife River Flint	
unlabeled		Cody Knife	Knife River Flint	
unlabeled		Cody Knife	Knife River Flint	
unlabeled		Cody Knife	Knife River Flint	
unlabeled		Cody Knife	Knife River Flint	
unlabeled		Cody Knife	Knife River Flint	
unlabeled		Cody Knife	Chalcedony	
unlabeled		Stem	Jasper	
unlabeled		Stem	Knife River Flint	
unlabeled		Stem	Grey Chert	
unlabeled		Stem	White Chert	
unlabeled		Stem	Speckled Grey Chert	
unlabeled		Stem	Gronilid Siltstone	
unlabeled		Stem	Knife River Flint	
unlabeled		Stem	Knife River Flint	

unlabeled		Stem	Knife River Flint	
unlabeled		Stem	Knife River Flint	
unlabeled		Stem	Knife River Flint	
unlabeled		Stem	Jasper	
unlabeled		Stem	Knife River Flint	
unlabeled		Stem	Knife River Flint	
unlabeled		Stem	Dark Chert	
unlabeled		Stem	Knife River Flint	
unlabeled		Stem	Knife River Flint	
unlabeled		Cody Knife	Fused Shale	Tip Broken
unlabeled		Scottsbluff	Knife River Flint	Blade Broken
unlabeled		Alberta	Knife River Flint	Possible Alberta
unlabeled		Scottsbluff	Knife River Flint	Blade Broken
unlabeled		Scottsbluff	Knife River Flint	Blade Broken
unlabeled		Scottsbluff	Knife River Flint	Blade Broken
unlabeled		Alberta	Knife River Flint	Blade Broken
unlabeled		?	Knife River Flint	Blade Broken; Stem but poor flaking
		?	Knife River Flint	Small little point with distinct shoulders

Unnamed									NW - 23 - 8 - 12 - W3
Catalogue Number	Full Length	Blade Length	Blade Width at Shoulders	Maximum Thickness	Stem Length	Stem Width	Type	Material	Comments
485	62.9		30.7	8.2			Scottsbluff	Fused Shale	Stem broken below shoulder; Tip broken by impact
unlabeled	47.1	27.4	24.8	6.1	19.7	16.5	Scottsbluff	Fused Shale	Heavily damaged; lots of reworking
a230	66.8	54.4	10.4	4	12.4	8.7	Eden	Jasper	
a221	49.7	34.2	11.5	6.4	15.5	11.1	Eden	Chalcedony	Reworked
987	20.5	8.6	8.3	3.8	11.9	8.1	Eden	Knife River Flint	Reworked down to almost just stem
unlabeled	77.5	64.1	12.5	4.3	13.4	10.9	Eden	unknown	Replica
unlabeled							stem	Fused Shale	

Unnamed									NE - 24 - 8 -12 - W3
Catalogue Number	Full Length	Blade Length	Blade Width at Shoulders	Maximum Thickness	Stem Length	Stem Width	Type	Material	Comments
a658	34.8	21.8	23.3	6.4	13	12.8	Alberta	Fused Shale	
a662	33.4	22.9	19	5.5	10.5	15.2	Alberta	Fused Shale	Stem corner broken; asymmetrical reworking

unnamed									NE - 18 - 8 -11 -W3
Catalogue Number	Full Length	Blade Length	Blade Width at Shoulders	Maximum Thickness	Stem Length	Stem Width	Type	Material	Comments
a865	41.8	24.2	27	6.9	17.6	17.9	Cody Knife	Knife River Flint	Tip Broken; Very Alberta like in style

unnamed									SE - 3 - 9 -12 - W3
Catalogue Number	Full Length	Blade Length	Blade Width at Shoulders	Maximum Thickness	Stem Length	Stem Width	Type	Material	Comments
unlabeled							Alberta?	chert	large biface possible Alberta blade

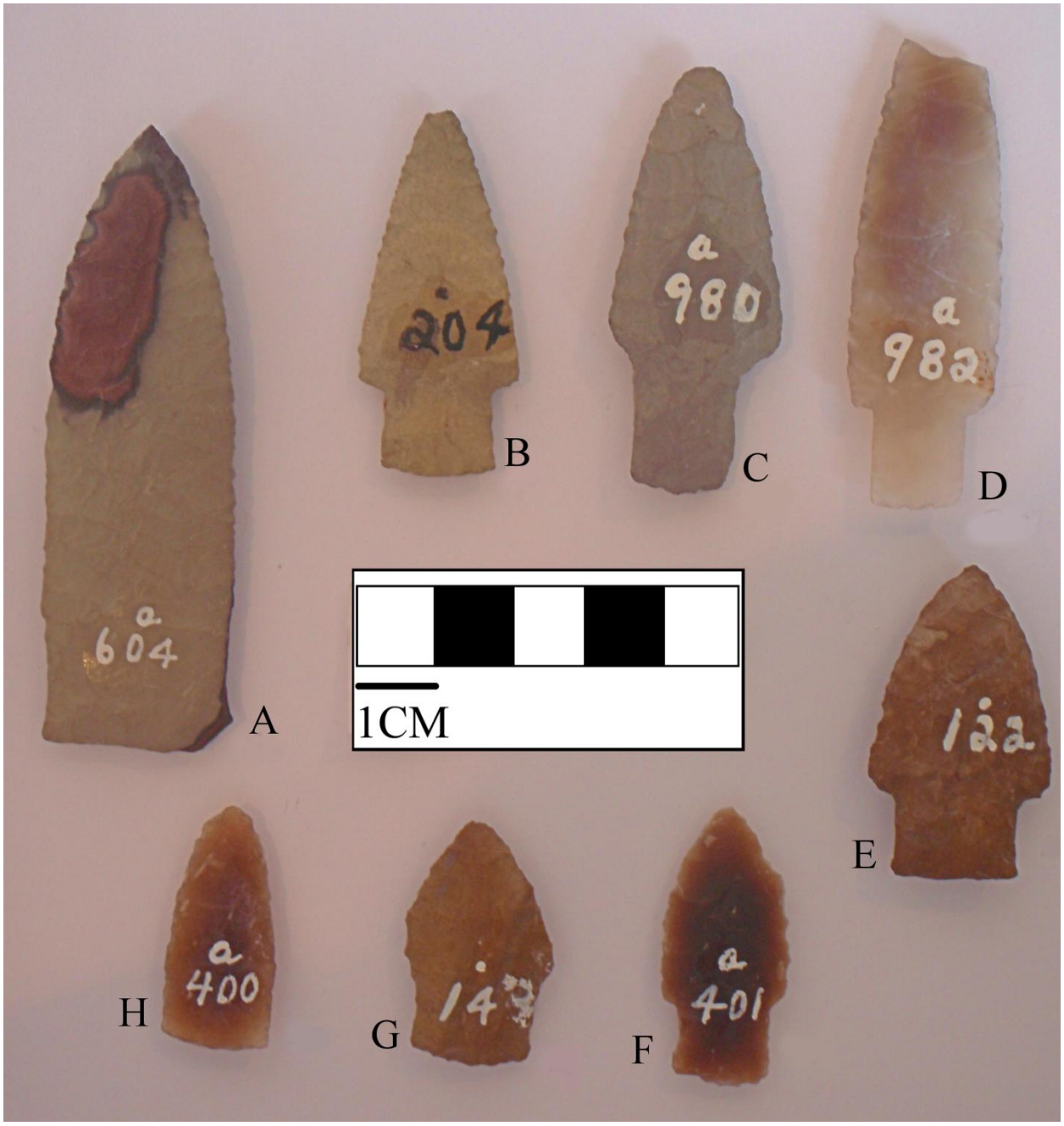
unnammed									SE - 18 -9 -12 -W3
Catalogue Number	Full Length	Blade Length	Blade Width at Shoulders	Maximum Thickness	Stem Length	Stem Width	Type	Material	Comments
unlabeled							Scottsbluff	Fused Shale	Not accessible for measurements

unnamed									SW - 10 - 9 - 11 - W3
Catalogue Number	Full Length	Blade Length	Blade Width at Shoulders	Maximum Thickness	Stem Length	Stem Width	Type	Material	Comments
a359							Cody Knife	Knife River Flint	Not accessible for measurements

Appendix B

Artefact Photographic Archive

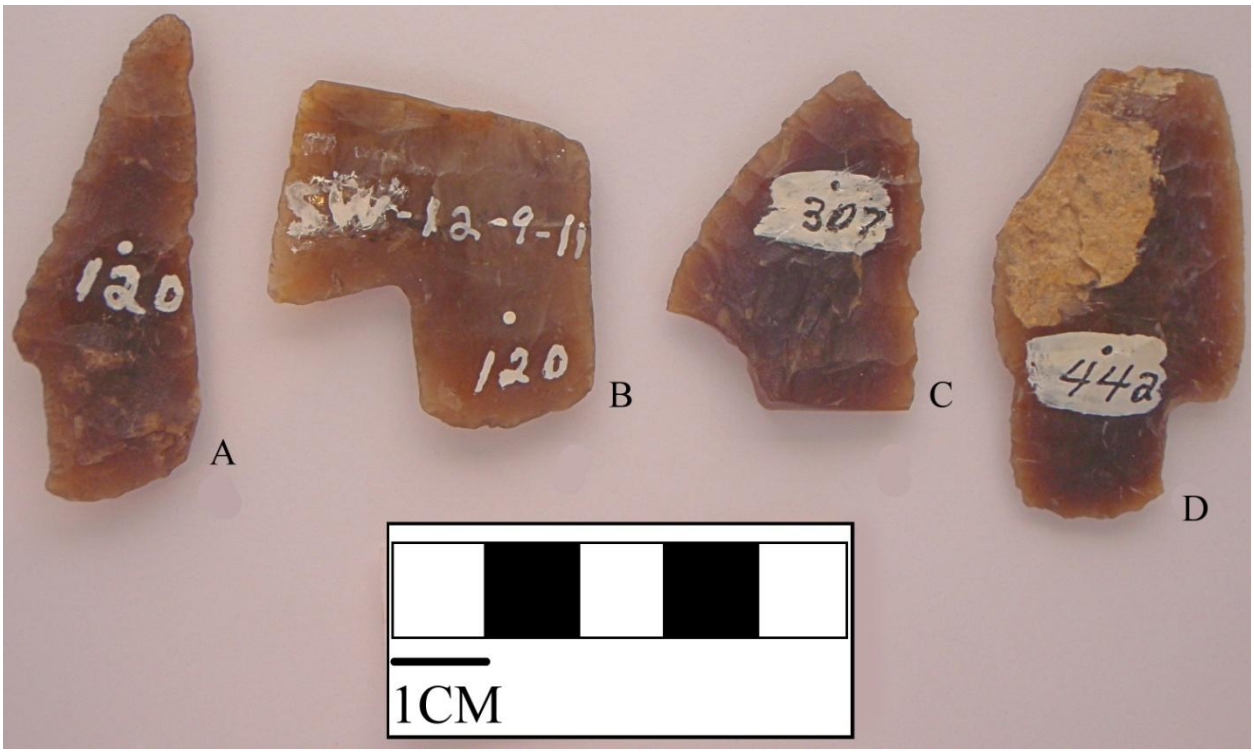
Niska Site



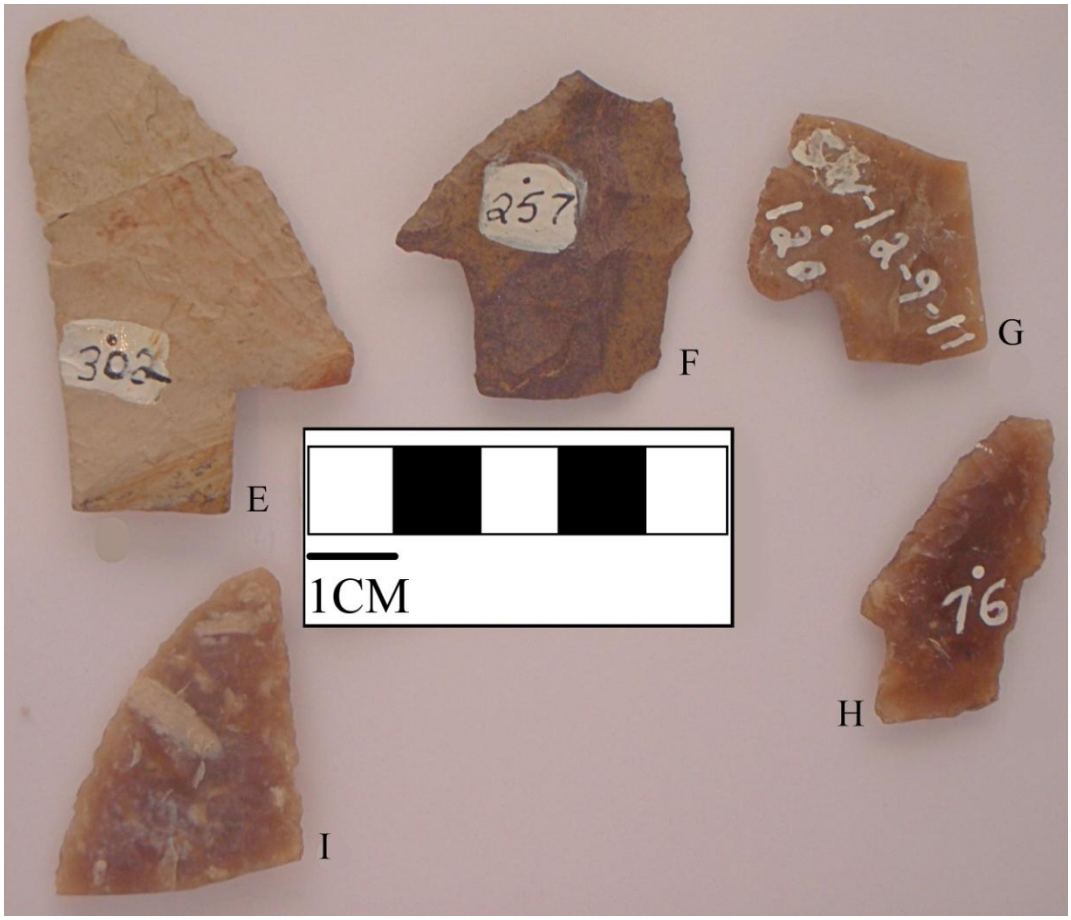
Scottsbluff projectile points recovered from the Niska site. A, B, C, E, G are made of different types of fused shale, D is made of agate and F, H are made of Knife River flint.

Above and below Scottsbluff projectile points recovered from the Niska Site. A, F, G are made of different types of fused shale and B, C, D, E are made of Knife River flint.

Above blade fragments and below are stem fragments. A is made of a chalcedony, B is made of an unknown silicified material, C is made of Jasper and the stems are various types of fused shale.



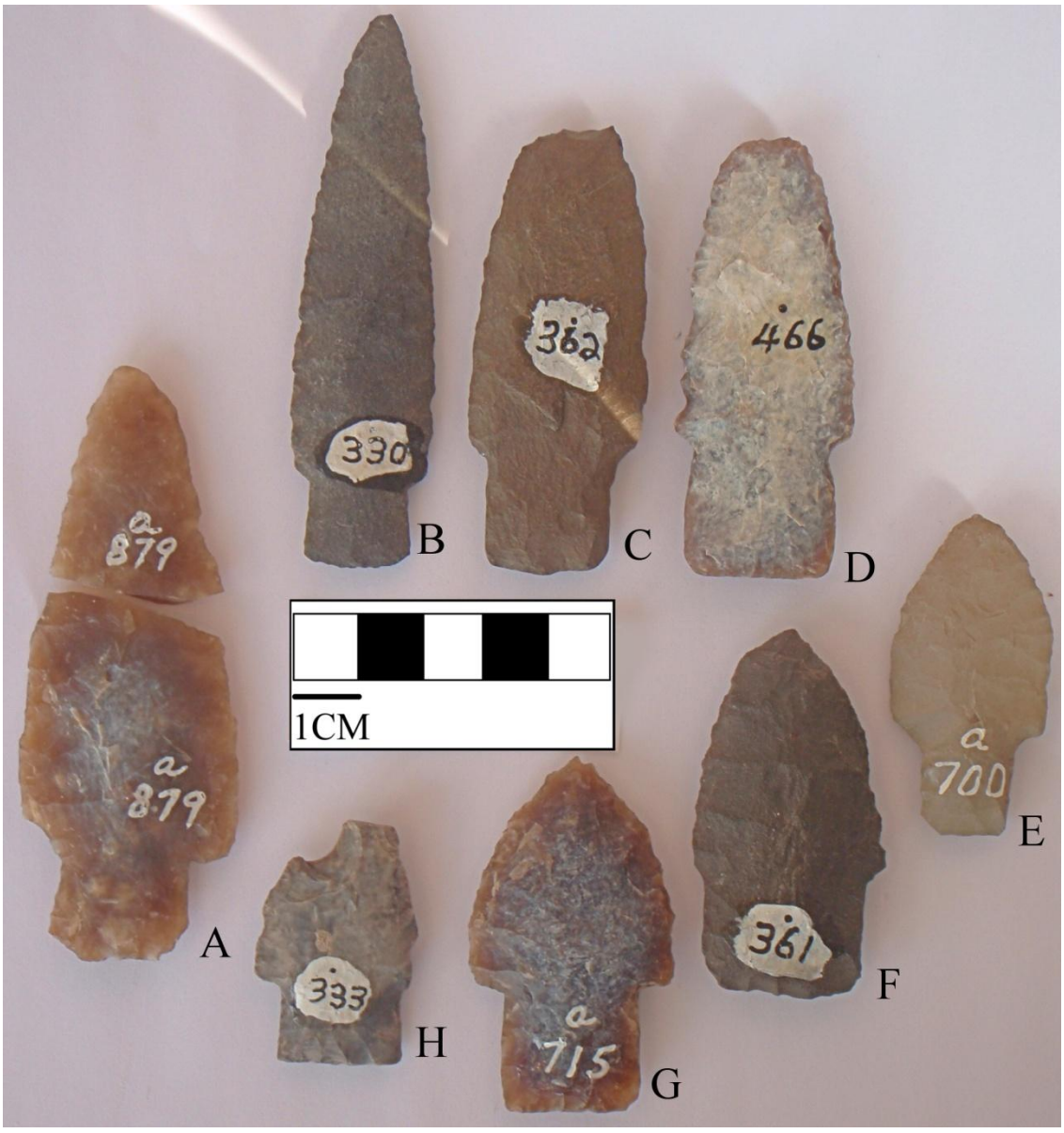
Above and below Cody knives recovered from the Niska site. A, B, C, D, G, H , I are made of Knife River flint and E, F are made of fused shale.



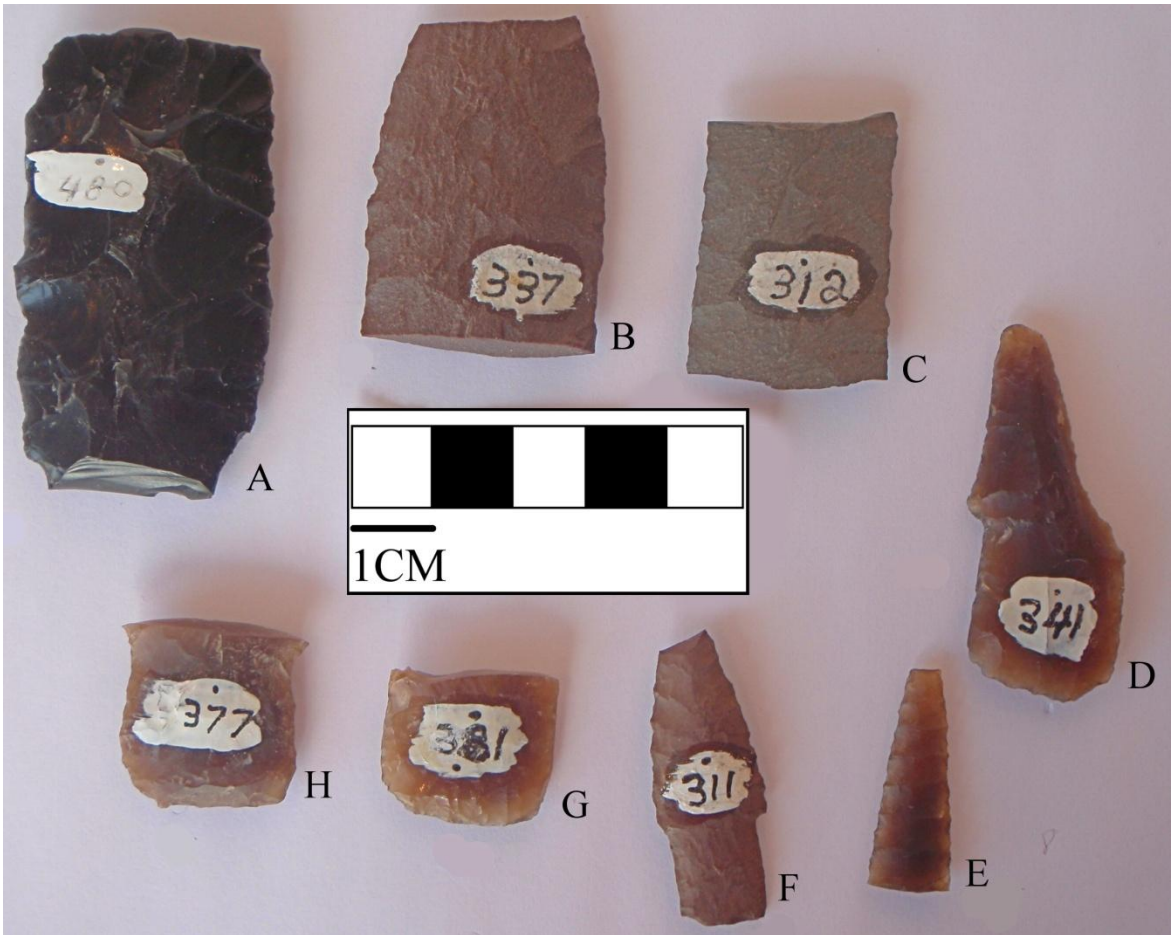
Heron Eden Site

Projectile points recovered from the Heron Eden site in the possession of the University of Saskatchewan. A, C, E, F, H, I are made of Knife River flint, B, D are made of agate, G is made of Beaver River sandstone and J, K are made of jasper.

Napao Site



Mostly complete projectile points recovered from the Napao site. A) Alberta type made of Knife River flint, B) Scottsbluff type made of fused shale, C) Alberta type made of fused shale, D) Scottsbluff type made of Knife River flint, E) Alberta type made of fused shale, F) Alberta type made of fused shale, G) Scottsbluff type made of Knife River flint, H) Scottsbluff type made of chert.



Projectile points recovered from the Napao site. A) Blade fragment made of obsidian, B) Blade fragment made of feldspathic siltstone, C) Blade made of fused shale, D) Scottsbluff points with heavy reworking made of Knife River flint, E) tip fragment made of Knife River flint, F) Scottsbluff point made of fused shale, G) stem made of Knife River Flint, H) Stem made of Knife River flint

Projectile point fragments recovered from the Napao site. A) stem made of fused shale, B) blade portion made of fused shale, C) stem fragment made of Knife River flint

Large Scottsbluff point made of fused shale and Cody knife made of Knife River flint recovered from the Napao site

Tools recovered from the Napao site associated with the Cody Complex material

Dunn Site

Scottsbluff projectile points made of Knife River flint.

Above and Below: Projectile points made of Knife River flint, at various levels of fragmentation, recovered from the Dunn site

Projectile point fragments made of Knife River flint recovered from the Dunn site. All of these have stem or parts of the stem remaining.

Projectile point fragments recovered from the Dunn site. The top left point is made of fused shale with the rest of them being made of Knife River flint.

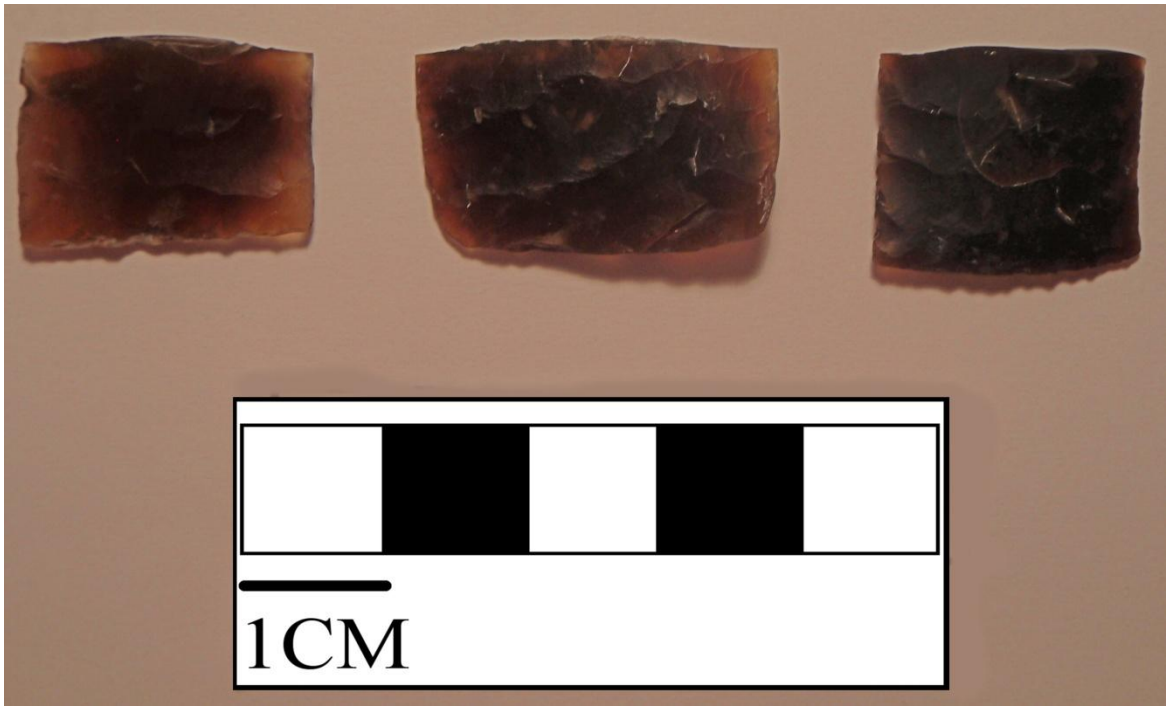
Above: Projectile point tips recovered from the Dunn site.

Below: Blade fragments recovered from the Dunn site. All of these specimens are made of Knife River flint.

Projectile point made of a chalcedony

Cody knife made of Knife River flint

Stems made of Knife River flint



Large blade and tip fragments made of Knife River flint.

Projectile point blade fragments. Left one is made of silicified peat with the others made of Knife River flint

Projectile points made of Knife River flint.

Top: Tip fragments made of Knife River flint

Middle: Blade Fragments made of Knife River flint

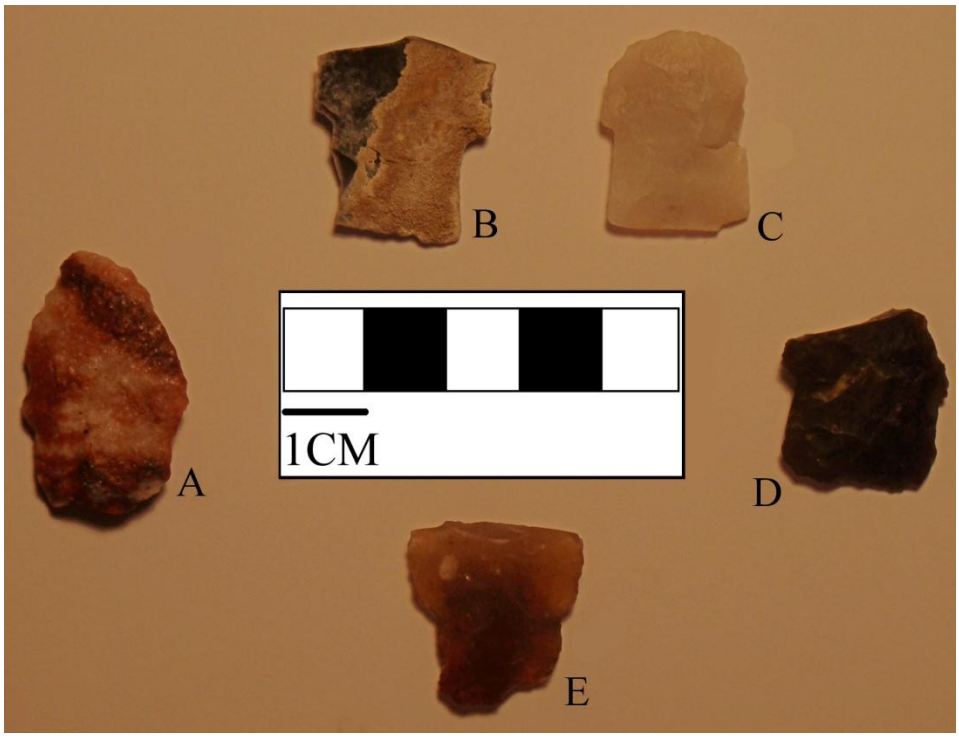
Bottom: Blade Fragments made of Knife River flint

Endscrapers made of Knife River flint.

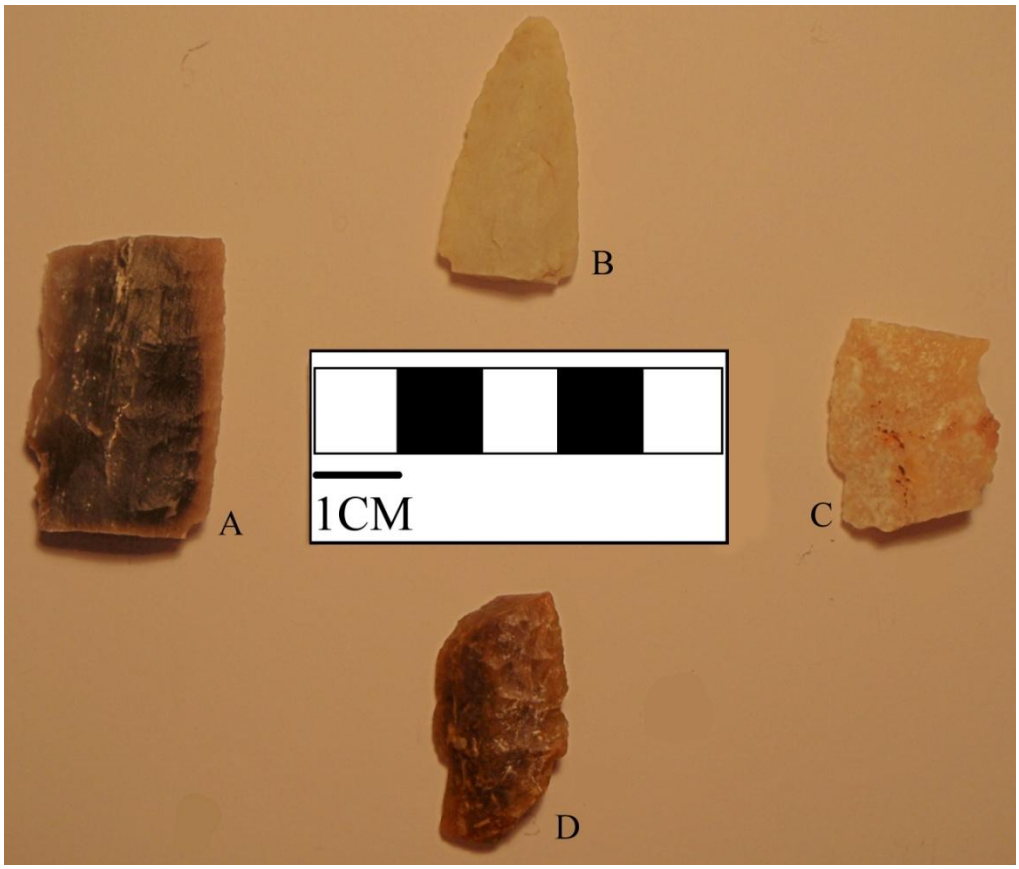
Farr Site

Cody Complex projectile fragments. A) Scottsbluff type made of chert, B) blade made of Knife River flint, C) Cody knife made of white chert, D) Eden type made of garnet chert, E) Eden type made of orange chert, F) Eden type made of fused shale, G) Eden made of red jasper, H) Eden made of grey quartzite, I) fragment made of Knife River flint

Cody Complex projectile points recovered with all or part of the stem remaining. A) Scottsbluff type made of Knife River flint, B) Cody Knife made of Knife River flint, C) Scottsbluff type made of Agate, D) Scottsbluff type of fused shale, E) Scottsbluff type made of Knife River flint, F) Scottsbluff type made of Knife River flint, G) Scottsbluff type made of silicified wood, H) Scottsbluff type made of grey chert



Above and Below: Cody Complex points. A) Cody fragment made of Swan River chert, B) Scottsbluff made of chert, C) Scottsbluff made of chert, D) Cody fragment made of a dark chert, E) Scottsbluff type made of agate, F) Scottsbluff made of agate, G) Scottsbluff made of Knife River flint, H) Scottsbluff made of Knife River flint, I) Eden made of chert, J) Scottsbluff type made of chalcedony



Above: Cody complex projectile points. A) Scottsbluff made of silicified wood, B) Scottsbluff made of white chert, C) Scottsbluff made of Swan River chert, D) Scottsbluff made of brown chert

Below: Stem fragments. E) fused shale, F) Swan River chert, G) Swan River chert, H) Knife River flint, I) Knife River flint

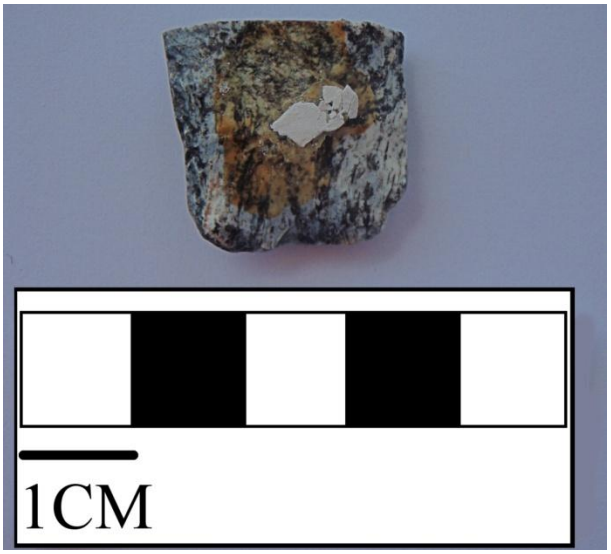
Radisson Area Collection

Cody Complex material recovered from the Radisson area by Wayne Lerch. A) Alberta type made of Beaver River sandstone, B) Scottsbluff type made of Beaver River sandstone, C) Scottsbluff type made of Beaver River sandstone, D) Alberta type made of Beaver River Sandstone, E) Scottsbluff type made of Knife River flint, F) Scottsbluff type made of basalt, G) Scottsbluff type made of chert, H) Scottsbluff type made of Swan River chert, I) Scottsbluff type made of chert, J) Scottsbluff type made of chalcedony, k) Preform made of Swan river chert, L) Cody Knife made of Swan River chert, M) stem made of chert, N) stem made of Swan River chert, O) stem made of chert, P) stemmed drill made of Knife River flint, Q) stemmed drill made of Knife River flint

Bambino site (DkNu-37)

Cody Complex material recovered from the Bambino site. A) Alberta type made of fused shale, B) Alberta type made of fused shale, C) Scottsbluff type made of fused shale, D) Alberta type made of fused shale, E) Alberta type made of Knife River flint, F) Cody knife made of fused shale

Cody knife made of Knife River flint



Stem fragment made of chert. Residue of glue and what it was mounted too is still adhering to it.

Blade tips. A is made of fused shale and B, C are made of Knife River flint

Bosco Site (DkNv-12)

Scottsbluff type projectile point made of Knife River flint

Cody Knife made of fused shale

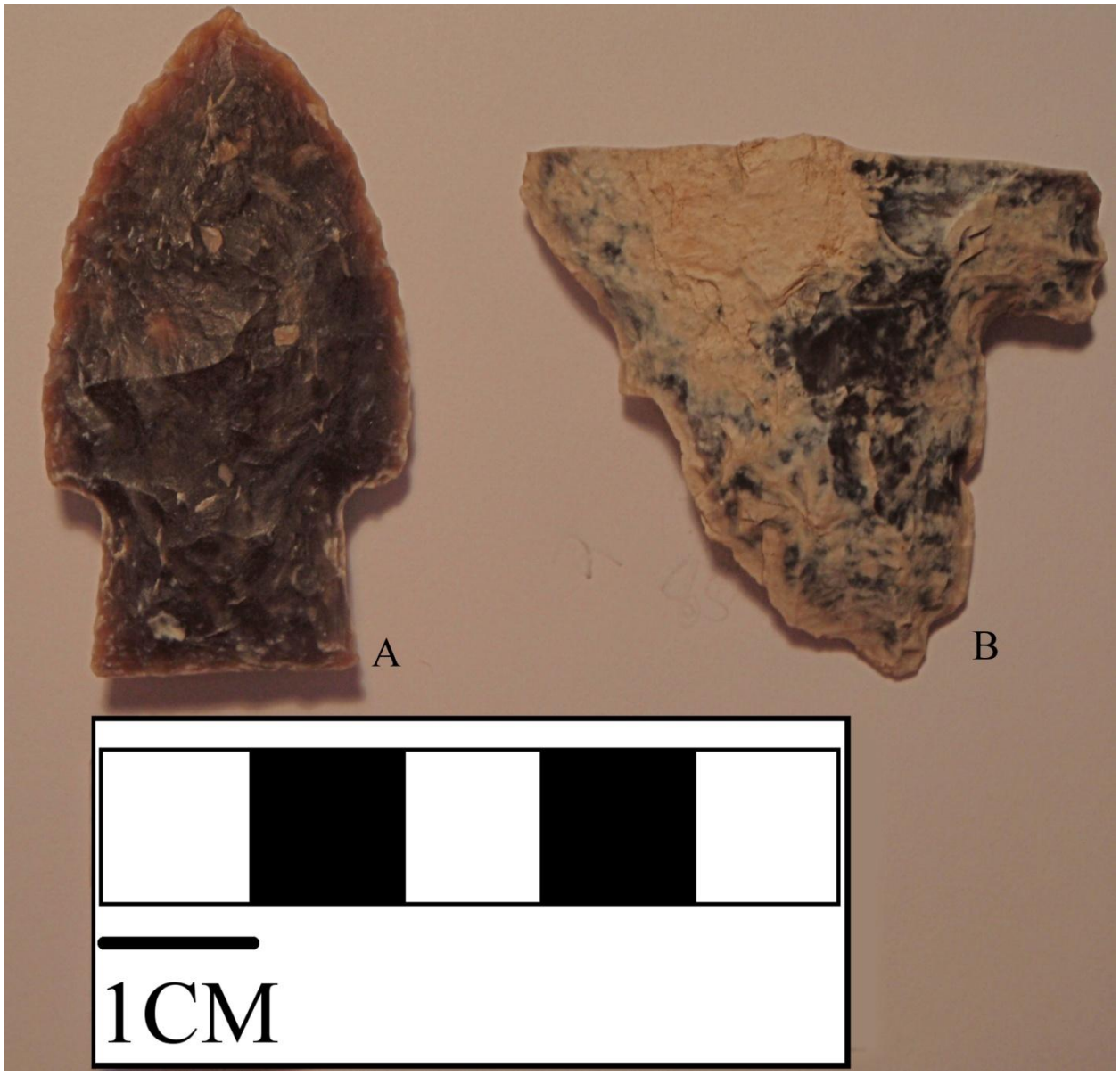
DjMp – 3

Scottsbluff type, with heavy reworking, made of Knife River flint

Cody Knife made of Knife River flint

Projectile point fragment made of Knife River flint

DjNf – 10

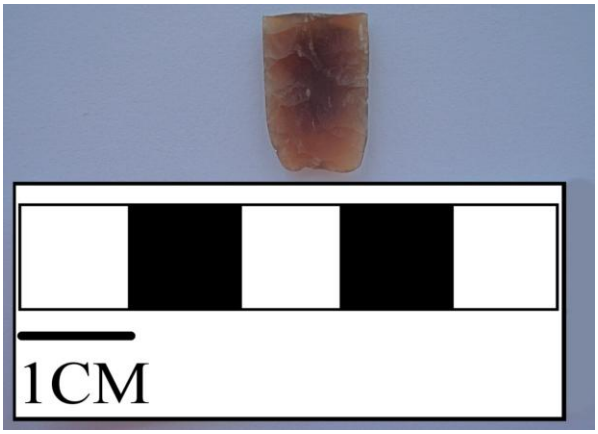


A) Scottsbluff type made of Knife River flint. B) Unfinished point made of Knife River flint.

DjNv – 2

A) Preform made of Knife River flint, B) Scottsbluff type made of Knife River flint, C) Scottsbluff type made of fused shale

DkNv - 7



Stem made of Knife River Flint

DkNv – 14

Two Scottsbluff projectile points made of different coloured fused shale.

DkNv – 4

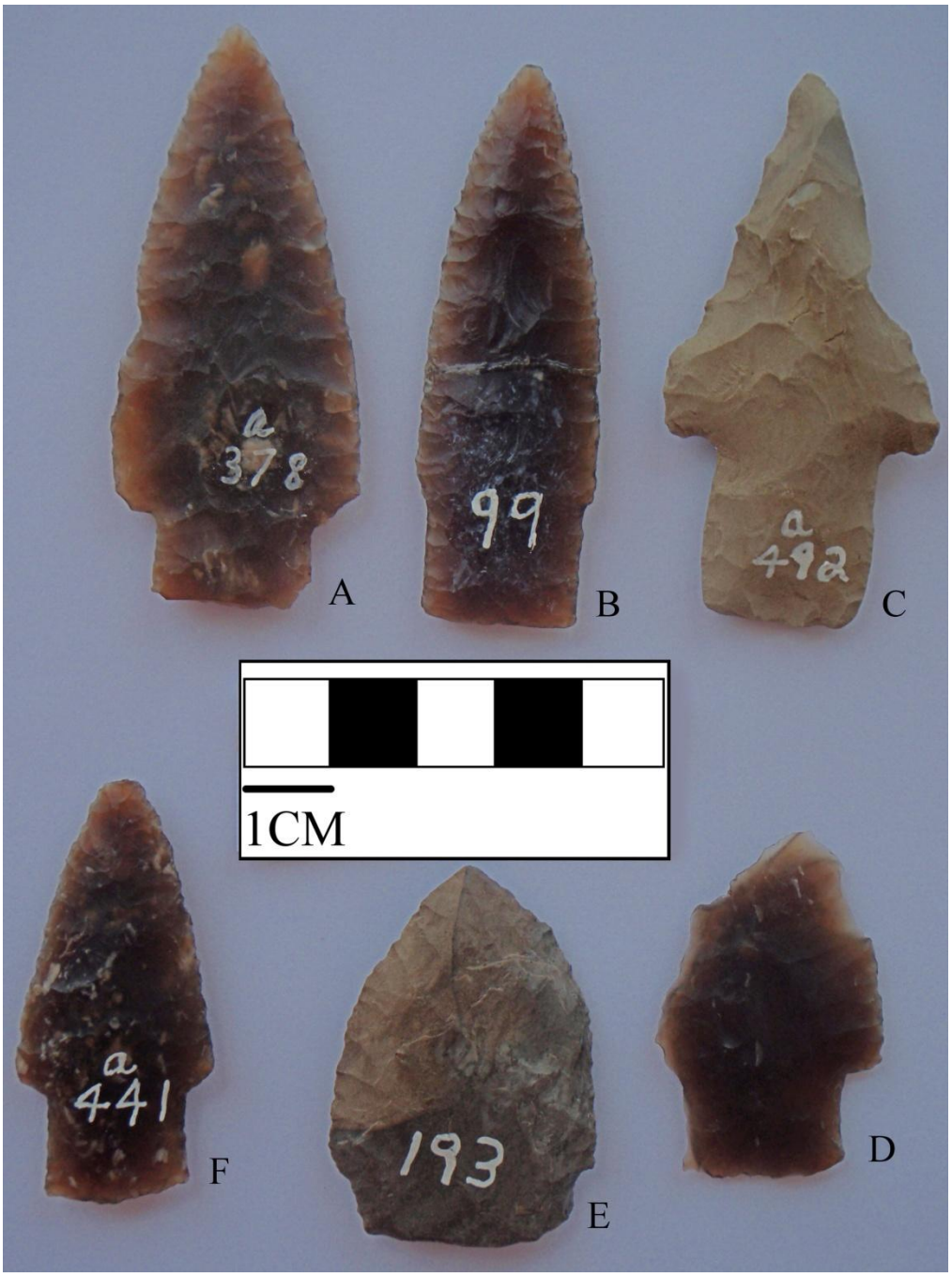
Scottsbluff type made of fused shale.

EdNg – 7

Alberta type made of Knife River flint. It has been split laterally. The split was probably caused by heating after it was discarded.

Scottsbluff point made of fused shale. It has been broken mid way up the blade.

DkNu – 15 (NE – 18 – 8 – 11 – W3)



A, B, F, are Scottsbluff type points made of Knife River flints, C, E are Alberta points made of fused shale and D is a Cody knife made of Knife River flint

NW – 23 – 8 – 12 – W3

Scottsbluff projectile points made of fused shale.

NE – 24 – 8 – 12 – W3

Scottsbluff type made of fused shale

Point recovered east of Elbow, Saskatchewan

Scottsbluff type made of Swan River chert that has been heavily reworked. Precise find location is not known.

DkNv – 18

Cody knife made of Knife River flint.

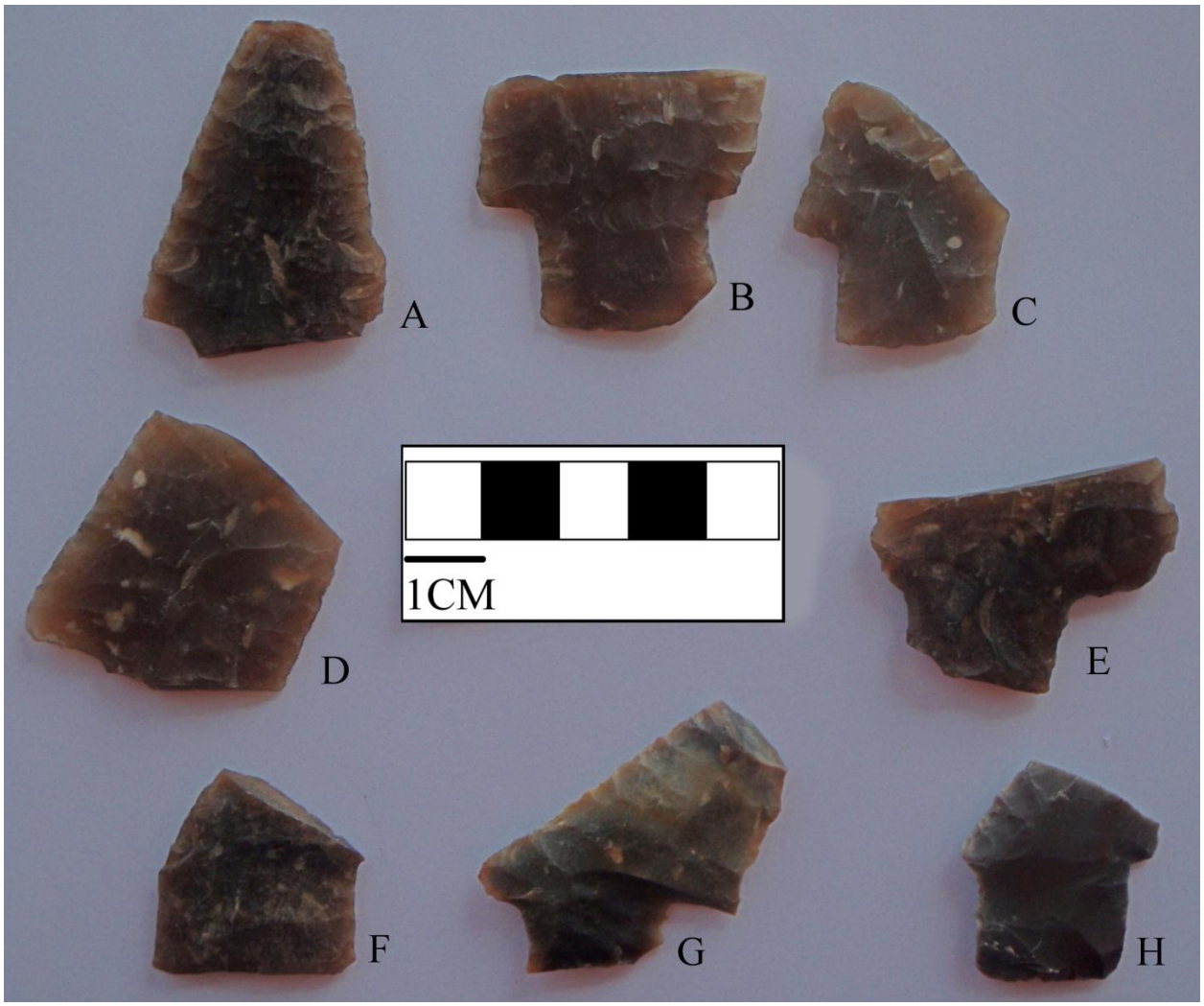
NW – 23 – 8 – 12 – W3

A) Eden type made of agate, B) Scottsbluff type made of Fused shale, C) Scottsbluff type made of fused shale, D) Eden type made of chalcedony, E) caste of a Eden type, F) stem made of fused shale, G) Eden type made of Knife River flint

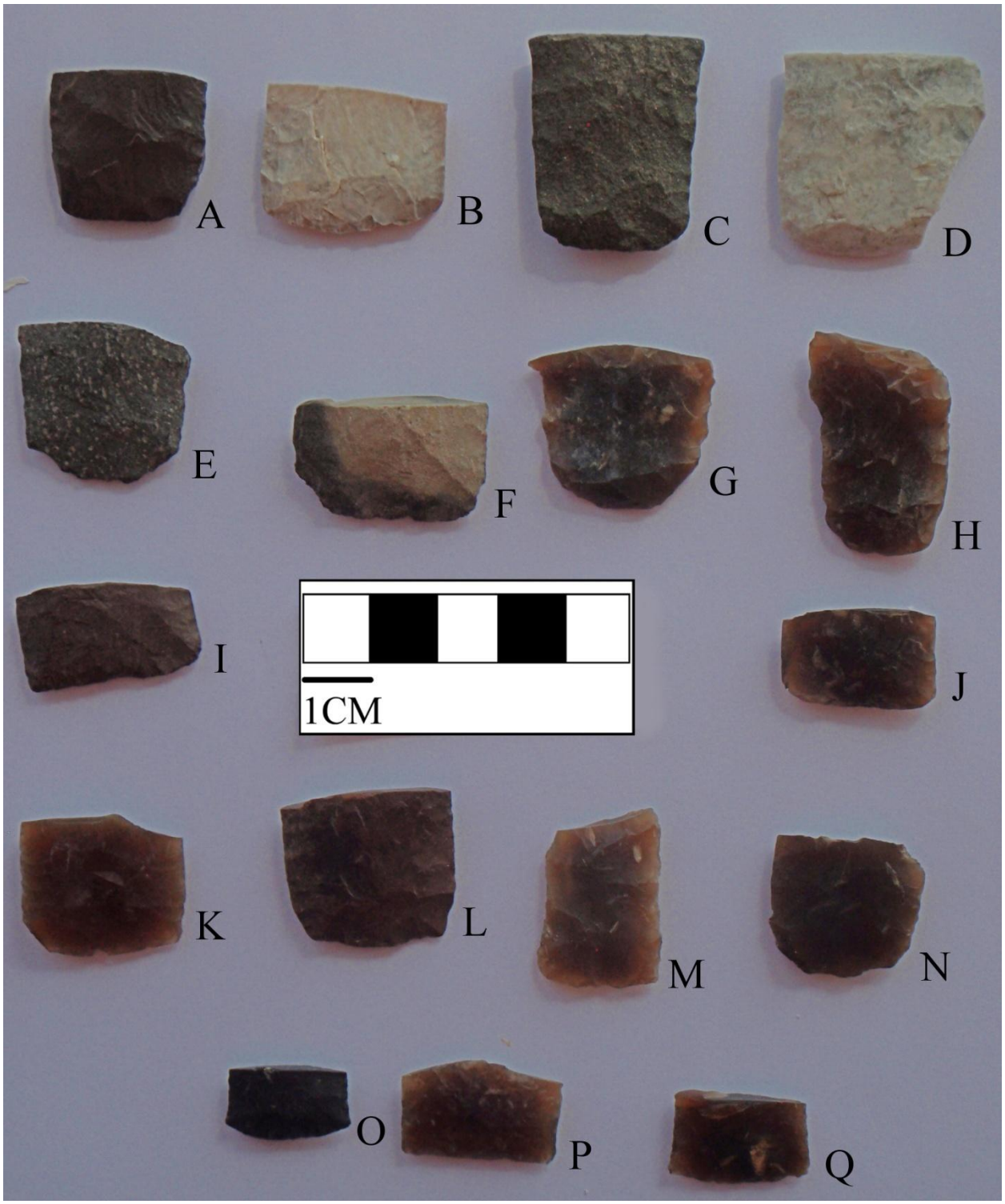
Ponteix Paleo-Indian

All the artefacts under this section are from around the town of Ponteix but precise locations are unknown

A) Cody knife made of fused shale, B) Scottsbluff type made of Knife River flint, C) Alberta type made of Knife River flint, D) Scottsbluff type made of Knife River flint, E) Scottsbluff type made of chalcedony, F) Scottsbluff made of Knife River flint, G) Alberta type made of Knife River flint, H) Preform made of Knife River flint, I) Scottsbluff type made of Knife River flint



Cody knife fragments. A, B, C, D, E, F are all made of Knife River flint, G is made of chert and H is made of fused shale.

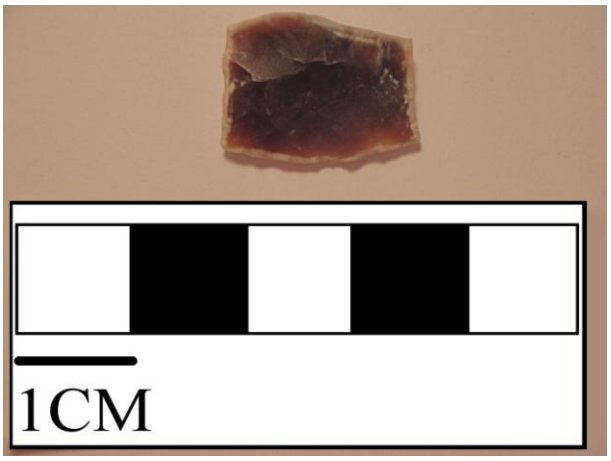


Stem fragments. A, C, E, F, I, L, O are made of fused shale, B, D, G, H, J, K, M, N, P, Q are made of Knife River flint.

EdNf – 2

Cody Complex projectile point made of Knife River flint. The stem has been broken off and the tip has suffered an impact fracture.

BiMp – 4



Stem made of Knife River flint

SE – 3 – 9 – 12 – W3

Scottsbluff projectile point made of chert. Modern breakage can been seen, which has also removed most of the stem.